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MUSCOLOGIA BRITANNICA;

CONTAINING

THE MOSSES

OF

GREAT BRITAIN AND IRELAND,

SYSTEMATICALLY ARRANGED AND DESCRIBED;

WITH

PLATES ILLUSTRATIVE OF THE CHARACTERS

OF THE

GENERA AND SPECIES;

BY

WILLIAM JACKSON HOOKER, LL.D., F.R.A., & L.S.
AND REGIUS PROFESSOR OF BOTANY IN THE UNIVERSITY OF GLASGOW,

AND

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PROFESSOR OF NATURAL HISTORY IN THE ROYAL INSTITUTION OF CORK.

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TO

THE REV. JAMES DALTON, A. M.

RECTOR OF CROFT IN YORKSHIRE,

ETC. ETC.

THE MUSCOLOGIA BRITANNICA

IS DEDICATED,

IN TESTIMONY OF

THEIR MOST GRATEFUL AND AFFECTIONATE REGARD

AND ESTEEM,

BY

THE AUTHORS.

INTRODUCTION

TO THE SECOND EDITION.

To render the Mosses of the British Islands generally known,—to give to other Naturalists an opportunity of profiting by those researches, upon which we have ourselves bestowed much time and patience;—to fix, if possible, this department of our Botany upon a firmer basis; and, by facilitating the investigation of one of the most beautiful parts of the Creation, to place in a clearer light the wonders of the Divine hand;—such are the motives that we set before us in the undertaking of this work, and such the objects which we flatter ourselves we shall be found, in some measure, to have attained. At the same time, however, that we trust we may be allowed to indulge this hope, we are sensible that it can only be entertained to a very limited degree. Much may, notwithstanding, still be done, though all cannot be accomplished; and, to us, the very study requisite for effecting it, proves, in itself, a pleasure that repays the toil.

To revert more immediately to the object before us, the *Muscologia* is a subject comparatively new, scarcely 40 years having elapsed since the publication of Hedwig's Theory,—a work which first diffused over the science that light by whose aid all subsequent progress in its advancement has been made. The successive labours of this eminent Naturalist contributed to erect a system upon firm and philosophic grounds. He has been ably seconded by more recent authors, especially by Swartz and Mohr,

and his own pupil Schwaegrichen; but, perhaps, by none so effectually as Bridel, whose works upon the Mosses, though full of the strangest errors as to species and synonyms, contain a history of the science, and a review of whatever is connected with it, at once admirable and unrivalled. To him, therefore, we refer our readers for information on this head, and also to the excellent treatise, "*Zur Charakteristik der Ordnung der Laubmoose*," which constitutes the introductory part of the *Bryologia Germanica* of Nees Von Esenbeck and Hornschuch. The Memoirs, too, of our countryman Mr. Brown, in the Transactions of the Linnæan Society, and those of Dr. Greville and Mr. Arnott in the Transactions of the Wernerian Society, accompanied with a great number of beautiful figures, may be consulted with great advantage. The line which we have drawn out for ourselves in the present undertaking, precludes us from entering upon this subject in the manner we could wish; our intention in this preface being little more than briefly to state what may be expected in its pages.

No country, perhaps, of similar extent, is more favourable to the growth of Mosses than the British isles, where there is so great a variety of soil, and no inconsiderable difference in the climate, between the plains and the summits of our highest hills. Our woods, morasses, rocks, and shaded banks, afford nourishment to a variety of species; and our mountains, though of inconsiderable elevation when compared with the Alps of Switzerland and Savoy, of Germany and the Pyrenees, yet on account of their more northern latitude, and of their rising nearly to the limits of perpetual snow, produce most of the Mosses of those highly favoured regions. In so few parts of Europe has the Muscology of the country been fully investigated, that we scarcely feel ourselves competent to draw a comparison between this department of the Flora of any district and our own;—and the attempt we made to do so, in the preface to our first edition

of this work, by mentioning those Mosses of Germany, of France, and of Lapland, which Britain was supposed not to possess, has now been proved incorrect, by the subsequent discovery of several of those very species; whilst, on the other hand, some species which we then considered peculiar to our islands, have recently been detected on the Continent by the industry of the students of Muscology.

In France, including the vast extent of the Alps and Pyrenées, Professor De Candolle has enumerated 227 species; but this number must be far short of the truth; for we know that our friends, Mr. Arnott and Mr. Bentham, are in themselves able to add considerably to this list. Germany, according to Mohr, reckons rather more than 280 species; but to what extent Nees and Hornschuch will increase the catalogue, we are unable to say, since only a small portion of their valuable work has yet appeared; including merely their genera, *Sphagnum*, *Phascum*, *Voitia*, *Pyramidula*, *Schistidium*, *Schistostega*, *Gymnostomum*, and *Hymenostomum*; or, in other words, those genera which are destitute of a true peristome to the capsule. These alone amount to 68; while the same division in Mohr, contains just half that number; so that another difficulty exists in estimating the comparative proportion of Mosses in different countries, even where they have been best explored; namely, the various opinions of Botanists as to what are species, and what varieties, of these plants; for every one is at liberty to exercise his own judgment upon such points. Lapland, according to Wahlenberg's statement, has 160 species; and Sweden, according to the same author, 226. These are all the European countries of which any attempt has been made at forming a *Muscologia*, and it must be remembered, that all these writers, not even excepting Mohr, who has greatly reduced the number of species made by preceding Botanists, describe, as distinct individuals, many plants which we look upon only as varieties.

The number of Mosses, included in the present work, is 290; and of these the most remarkable kinds, which, we believe, have not yet been found upon the Continent of Europe, are *Gymnostomum viridissimum*, *Griffithianum* and *Donianum*, *Grimmia leucophæa* and *unicolor*, *Weissia Templetoni (?)*, *Trichostomum ellipticum*, *Glyphomitrion Daviesii*, *Didymodon nervosum* and *flexifolium*, *Orthotrichum Drummondii*, *Daltonia splachnoides*, *Bartramia arcuata* and *Hookeria læte-virens*.

On the other hand, the most striking species contained in the Floras of Continental writers, and which Great Britain cannot yet boast of possessing, are, *Voitia nivalis*, *Pyramidula tetragona*, *Anictangium aquaticum* and *pulvinatum*, *Grimmia plagiopodia*, *Didymodon pallidum*, *Splachnum rubrum* and *luteum*, *Systylium splachnoides*, *Tayloria splachnoides*, *Dicranum ambiguum*, *Schraderi* and *cylindricum*, *Polytrichum capillare* and *lævigatum*, *Fontinalis falcata*, *Neckera cladorhizans*, *Cinclidium stygium*, *Mnium turgidum*, and *Bryum squarrosum*.

From the above remarks it will be judged, as we might expect from the vicinity of the two countries, that the *Muscologia* of Britain is very similar to that of the central and Northern Continent of Europe. It will excite more surprise to find that the distant Continent of North America, especially in the corresponding parallels of latitude, presents a *Muscologia* even more similar to ours than that of Europe. Mr. Scouler has brought from the opposite side of the New World,—from the Columbia and Nootka,—many Mosses, which prove to be the same as those of our own country; and those who will be at the trouble to turn to the pages of the Botanical Appendix of Captain Franklin's Journey to the Polar Sea, from lat. 54°., will see at once how analogous are the Mosses of that country to the British. The indefatigable Botanists of the present, or second, overland Expedition through the same regions, have already collected still more important information on this head. Our invaluable friend,

Dr. Richardson, in his last letter, written to us from Fort Franklin, Great Bear Lake, says as follows :—

"Drummond's Mosses will probably be the most complete collection made in North America, and, I hope, will nearly equal the British Muscologia in number of species. The following list contains those not gathered in the former journey :—

Sphagnum latifolium.
Andræa rupestris.
Phascum subulatum,
— *crispum*, and ——?
Diphyscium foliosum.
Gymnostomum pyriforme,
— *truncatulum?*
— *lapponicum,*
— *rupestre.*
Encalypta streptocarpa,
— *rhaptocarpa.*
Weissia controversa,
— *curvirostra.*
Grimmia affinis.
Tortula subulata,
— *convoluta.*
Trichostomum pallidum,
— *microcarpum.*
Pterogonium, duæ species.
Leucodon sciuroides, et altera sp.
Dicranum longifolium,
— *montanum?*
— *heteromallum,*
— *rufescens, and nov. sp.*
Didymodon trifarium,
— *glaucescens,*
— *inclinatum.*
Cynontodium flexicaule.
Orthotrichum clavellatum,
— *pumilum,*
— *Ludwigii,*
— *crispum?*
Bartramia fontana,
— *pomiformis,*
— *crispa.*
Funaria ——?
Fontinalis capillacea, abundant and in fruit.
Anarrhopterum heterostichum.
Anomodon viticulosum.
Bryum roseum,
— *argenteum,*
— *punctatum,*
— *cuspidatum*, (the *cuspidatum* of the former journey proves to be *B. affine*)
— *marginatum,*
— *turbinatum.*
Leskeæ tres.
Hypnum triquetrum,
— *abietinum*, (in fruit both on Lake Superior and on Great Bear Lake)
— *dimorphum,*
— *rutabulum,*
— *cupressiforme,*
— *illecebrum,*
— *velutinum,*
— *incurvatum,*
— *prælongum,*
— *Halleri?*
— *aureum,*
— *riparium,*
— *alopecurum,*
— *aduncum,*
— *stellatum,*
— *Silesianum,*
— *pulchellum,*
— *polymorphum,*
— *julaceum,*
— *palustre, et tria altera.*

"The above list," he continues, "does not include the Mosses gathered by Drummond, since we separated. Added to the former collection, it raises the number of species which we know to inhabit those countries, to upwards of 150, and I trust we shall have detected nearly as many more by the time we meet."

In a work like the present, it will not be expected that we should enter much on the subject of the structure of the Mosses, or their modes of increase, or what have been considered by most authors as the Organs of fructification. Indeed, it is our opinion, even now, notwithstanding some lights that have been thrown upon these subjects, particularly by the German physiologists, that too little is at present known on these heads to enable us to speak satisfactorily. We have adopted, for the most part, Hedwig's terminology; but we have, in general, declined noticing the male flowers, as they are commonly called, not only because we think their office, or use, is but imperfectly known, but because their existence is often very difficult to be discovered.

There are two distinct kinds of organs, supposed to be connected with the fructification of Mosses. One gives origin to a number of minute granules, which are, by Hedwig and most Botanists, considered as real *seeds*, and hence called the *Capsule*; and the other, which is judged by analogy, and by no means from the test of experiment, to be the *Anther*, or the organ producing the fertilizing substance. Of these we now proceed to give a short description; and for the sake of clearness, rather than from a conviction of the real nature of these parts, we shall call them the male and female organs.

The Mosses bear these male and female flowers separate, either arising from different points on the same individual, or having the two sexes produced upon distinct plants. Each flower, whether male or female, is surrounded by a number of small leaves, which differ from those of the stem, and are called, when taken collec-

tively, a *perichætium*, or when each leaf is taken separately, a *perichætial* leaf. These flowers spring either from the extremity of the stem, as in most of the upright growing Mosses, or laterally and from the axils of the leaves, as in most of the creeping kinds.

Each male flower consists of an uncertain number of minute, oblong bodies, of a reticulated texture, cylindrical, which are considered to be the *Anthers;* they are placed upon a short *foot-stalk*, which may be termed the *filament*, and they are filled with a pulpy, or somewhat granular pellucid substance, which, upon placing the Anther in water, under a microscope, may be seen to be discharged from the upper extremity. These *Anthers* empty themselves spontaneously while attached to the plant, and remain mere single-celled cases, or bags. This apparently pulpy substance is looked upon as the *pollen*, and is supposed, in a manner not easily accounted for, to find its way to the pistils, however distantly they may be situated.

The female flower consists, in like manner, of an uncertain number of supposed pistils, of a linear, or oblong form, at the base swelling, and constituting the *Germen*, which is gradually lengthened out into what is called the *Style;* and the termination, which is not unfrequently dilated, or open at the mouth, is termed the *Stigma*. Both the Anthers and pistils are generally mixed with a considerable number of minute jointed filaments, whose use is not known, but which are called by Hedwig "*fila succulenta*." These constitute the whole of what are called the flowers.

There is something in the gradual enlargement of the base of the *pistil*, or *germen*, which is very similar to the increase of the pistil in phænogomous plants; but then it is followed by other circumstances widely different. The base of *one* of the pistils gradually swells more and more; and, after a certain period, the upper part of the *style* and *stigma* wither, but still remain. The *Germen* is now seen, covered by a thin membrane; which, as the

fructification advances, separates transversely at the bottom, and rising up with the more advanced germen, takes the name of *Calyptra*, or *veil*. It is carried up by means of a *pedicel*, or *fruit-stalk*, which now develops itself, and reaches to a different height in different species; in some, being five or six inches in length. When it has attained its utmost development, the mature germen becomes the perfect fruit, and is called the *Capsule*. The *Calyptra*, with its acuminated persistent style, drops off spontaneously, and exposes to view, on the top of the *capsule*, a *lid*, or *operculum*, which is variously shaped in different individuals, sometimes being almost plane, sometimes conical, sometimes subulate. This, in time, likewise, in almost every instance, falling away, exposes the mouth of the *capsule*, which affords some of the most important marks of distinction in the several genera of Mosses. In some, the *mouth* is quite naked; in others, it is furnished with a most beautiful and curious apparatus of teeth-like processes, or sometimes membranes, which some call a *fringe*, or *peristome*, and these are variously cut at the extremity. These processes sometimes form a single row about the mouth, and then it is called a "*peristomium simplex*;" or the row is double, whence the term "*peristomium duplex*."

Externally, at the base of the capsule, there is frequently a swelling of a different substance from the capsule itself; this is called the *apophysis*.

The *Capsule*, when ripe, is more or less of a horny, or cartilaginous substance, extremely variable in form; ovate, as in most Mosses; sphærical, as in some species of *Phascum* and *Bartramia*; quadrangular in some *Polytricha*; pyriform, or pear-shaped in *Funaria*; oblique and gibbous beneath, and plane on the top, in *Buxbaumia*. It is smooth in the generality of Mosses; striated, sulcated, or dotted in others. In the inside is a membranous bag, (or inner membrane, as it is called;) from this rises the inner fringe, when that is present; and it is it which con-

tains the mass of minute, generally sphærical granules, or seeds. Through the centre of this capsule, however, passes a little column, which is called a *columella*, and to which it appears that the seeds may have been attached in a young state, or which formed a part of that cellular substance which constituted the whole of the interior of the capsule, and in the circumference of which the seeds appear to have been imbedded.

Besides the structure of the fringe, or peristome, the situation of the pedicel, or *fruitstalk*, whether lateral or terminal, is found to be of great value in defining the genera. So also is the shape of the *Calyptra;* which is called dimidiate, when it is cleft on one side, and mitriform, when it is entire at the base.

The number of teeth which compose the peristome of Mosses is worthy of remark, being either 4, which is the smallest number, or a multiplicate of 4. *Tetraphis* has only 4 teeth; *Octoblepharis*, a tropical genus, has 8 teeth; *Grimmia*, *Dicranum*, and many others, have 16; *Didymodon* has often 32, and *Polytrichum* sometimes 64; but no Moss is known with any intermediate number. The office of these teeth seems to consist in aiding the discharge of the seeds of the capsule at a proper season.

The seeds, or organs of reproduction, are a fine dust-like substance; and require a dry atmosphere to accomplish their dispersion. Such is the hygrometric nature of the *peristome*, that when the weather is moist, it is entirely closed over the mouth of the capsule, and the seeds are prevented from escaping; in a dry season, the teeth are spread out in a radiating manner, or are reflexed: the seeds, by the shrinking of the sides of the capsule, flow over the margin, and are scattered far and wide by the winds.

With these *seeds*, or *sporules*, as they are called by many, Mr. James Drummond, F. L. S. of Cork, occupied himself for a series of years. He succeeded in raising more than 30 different kinds of Mosses from seed; and the result of his experiments he

mination of Mosses, from the Propagula," published in the 12th Volume of the *Acta Acad. Naturæ Curios.* p. 169, has satisfactorily shown, that the lines of longitudinal cellules, of which the stems and leaves are composed, are a continuation of the fibrous radicles that constitute the roots. The greater are the number of conferva-like shoots that unite, the thicker will be the stem, or the broader will be the leaf which they compose. (See the excellent plates accompanying Nees' Memoir just mentioned, t. 13, and 14.)

Such being the case, it will naturally be expected that the structure of the Mosses should be of the simplest kind. The Phænogamous plants, and even the Ferns are furnished with tubular vessels. In the vegetables in question, no such tubular vessels appear; *all* their parts are composed of but one original form, that is the cellular. A mass of cellules, more or less elongated, constitutes the whole plant; varying, however, infinitely in size and shape. Sometimes they are roundish, or oblong, or linear; sometimes decidedly hexagonal. Even in the unripe capsules and fruitstalks of these plants, the structure is as apparent as in the stems and leaves.

The want of tubular vessels is, however, compensated by the softness, delicacy, and absorbent property of the cellular tissue; and, indeed, in no other plants are the elegant and beautiful forms of that texture so distinctly displayed as in the Mosses; except, indeed, it be in the *Jungermanniæ*, which, in the formation of their cellules, bear a close similarity with those I am now describing.

The roots of the Mosses, are universally composed of extremely minute, simple, or branching fibres, generally thickly matted together. In the creeping plants, as in the *Hypnum* tribe, they grow from various parts, on the under side, of nearly the whole length of the stem. Even some that are of an upright growth, have this character, as *Bartramia arcuata;* in the case of this Moss, the plants become thickly matted together, from the

roots striking into the adjoining stems. Nay, such is the disposition manifested by some Mosses to throw out roots, that not a few of them are known to produce them at the extremity of their leaves; as does *Hookeria lucens*.

Very rarely are the stems wanting in the order *Musci*. Some individuals of the genus *Phascum* have very short ones, as have *Buxbaumia aphylla* and *Diphyscium foliosum*. Those stems that grow upright are usually but little branched; those that creep upon the ground are very much so.

No species of Moss is altogether destitute of *foliage*, although *Buxbaumia aphylla*, as its name implies, was long supposed to be without any. But the acute Mr. Brown has detected leaves of a very minute size, and cleft in a palmated, or almost digitated, manner; which is the more remarkable, because there is not known another instance, throughout the whole order of *Musci*, in which the leaves are, in the slightest degree, divided, farther than just at their margins into minute teeth or serratures. Nor is there ever found among the Mosses, a petiolated leaf, or one placed upon a footstalk. But the leaves themselves vary most strikingly in form and outline in different species, and furnish specific characters of great importance. Nor does any Moss exist having hairy foliage,—all are glabrous. Some, indeed, as *Neckera trichomitryon* and *Neckera hirtella*, *Weissia ciliata*, &c. have marginal ciliated processes; but they are never on the superficies of the leaf. Some are nerveless, but the greater number have a strong nerve, running through the whole centre of the leaf, from the base to the summit; others have two nerves, which are parallel to one another, and pass on each side of the centre of the leaf: and these nerves are only formed of closely compact cellules.

In general, the Mosses may rank among the smallest of vegetables; we know of some that are scarcely visible to the naked eye; but which yet are as curious and complicated in their structure as the larger kinds; a few of which attain, if they do not

exceed, two feet in length. One of the largest which our country produces, is the *Polytrichum commune*, of which we have frequently seen brushes made, and hassocks, used for kneeling upon in churches.

Like the Ferns, the Mosses delight chiefly in damp and shady situations; though they are by no means exclusively confined to these places of growth. From beneath the Torrid Zone, we have received portions of the stems of cocoa nut trees, entirely covered with a rare white Moss, the *Octoblepharum albidum* of Hedwig, and others of still more uncommon occurrence, gathered on the burning sands of the deserts, in the interior of Southern Africa. Upon thatched roofs, in our own country, is seen most abundantly the *Tortula ruralis*, forming a dense mass of a yellow green, or a rich brown colour, according as the plant is destitute of, or furnished with, its fructification. Mosses are frequently observed to grow in places that would hardly afford nourishment to any other kind of plant. The tops of the driest walls are covered with the little *Grimmia pulvinata*, whose leaves are tipped with long white pellucid hairs, and whose capsules, by the curvature of their footstalks, are curiously buried among these leaves. In the same places, and upon the sides of walls that are equally scorched and barren, grows the *Tortula muralis*. In a hot season, these Mosses, and very many others, become crisped, parched, and to all appearance, lifeless; but if only a slight shower falls, or a summer's evening dew, the most shrivelled, in a few minutes, are seen to be filled with moisture, which is indeed imbibed by them with wonderful rapidity. The same phenomenon occurs with the specimens that have been gathered and preserved in a dry state in the Herbarium for a century and more; immerse these in water, and they presently revive as much as if they were freshly gathered. It is in moist situations that by far the greater number of species are to be met with. Boggy and marshy places abound with them, and they there arrive at a great size. Although the low grounds

in the West Indian Islands, from the excessive heat and drought, produce comparatively but few Mosses; yet the summits of the Blue Mountains in Jamaica, afforded to a late eminent Botanist, Dr. Swartz, an abundant harvest of these plants. Perhaps the finest collection that ever was brought to this country by any naturalist was made by our friend, Mr. Menzies, when on the voyage of discovery, with Captain Vancouver, in New Zealand; a country subject to much moisture. In the South of Europe, in France and Italy, there are but few Mosses in the plains; though those, in general, are highly curious; but ascend to the summits of the Apennines, the Alps and the Pyrenées, where fogs and mists abound, and the Muscologist will be delighted with their productions. So it is, in some measure, with Great Britain; but as we are exposed to more frequent rains, and have naturally a more humid atmosphere, even in places of but little elevation, we have every where a considerable number of Mosses; and our mountains are indeed very rich in them. The summits of the loftiest Scottish mountains produce many extremely rare species, at an elevation above the sea of from 3,000 to 4,300 feet. In the Alps and the Pyrenées, on account of their more southern latitude, in order to find the same species you must ascend nearly twice that height, from 7, to 8,000 feet. The number of Mosses inhabiting Great Britain, as already mentioned, is about 290; a larger proportion, perhaps, than is to be seen upon a like extent of country, in any part of Europe.

The soil or substance on which Mosses grow is remarkable in some individuals. One curious little plant is found only on the perpendicular faces of the pure white chalk pits that abound so much in Kent and Sussex. Some are confined to granite; some to calcareous rocks; one species, the *Funaria hygrometrica*, a Moss that grows in all parts of the world, is almost sure to spring up where any thing has been burned upon the ground; and particularly where charcoal has been made, whence its French name

of *La Charbonnière*. Some are never found but upon the dung of animals, of oxen, and particularly of foxes; this is the case with most of the species of the genus *Splachnum*. One of these, the *S. angustatum*, which is commonly met with upon dung, we once saw growing vigorously upon the foot of an old stocking, near the summit of Ingleborough, Yorkshire; the same species was found by a friend of ours, covering the half decayed hat of a traveller who had perished on the mountain of St. Bernard in Switzerland: and the same, if we mistake not, was discovered by Captain Parry in Melville Island, vegetating in a bleached skull of the Musk Ox.

The trunks of trees, especially their *north* sides, have often a rich covering of Mosses; and those, to the observant natives of American wilds, are pretty sure guides to the points of the compass. Various kinds of *Neckera*, *Hypnum*, and especially the genus *Orthotrichum*, insert their slender fibres into the crevices of the bark, without, at the same time, appearing to do much injury to the tree. On the contrary, they probably serve to protect the bark from the inclemencies of winter, and the droughts of summer, as they certainly do insects, which there take refuge at all seasons of the year: and an Entomologist, by examining these tufts of Mosses, especially among their roots, will find a number of rare species to reward his labour. This circumstance has been beautifully noticed by Linnæus, when speaking of Mosses, in his *Systema Vegetabilium*. "Hæ radices," he says, "incolarum fovent;—ne adurantur a bruma hyberna; ne exsiccantur a Sirio æstivo; ne evellantur a vicissitudine vernali; ne corrumpantur a putramine autumnali." So that nothing, not even the minutest vegetable, seems to be made in vain.

Scarcely any part of the world is destitute of Mosses, from the Equinoctial Line to the Polar Regions. On the coasts of the Icy Sea, in situations where the soil never thaws for more than the depth of a few inches, Mosses and lichens are said by travel-

lers to be almost the only vegetable productions. On the Northern border of Siberia, towards the coast of that sea, for the width of some hundred versts, upon an immensely extended morass, destitute of trees, the entire soil is said to be covered with Mosses, which thrive although their roots are only just above the crust of eternal frost; and on which, even in summer, you travel in sledges drawn by Rein-deer. In Spitzbergen, according to Martens, the rocks of Schistus, rising out of the mass of everlasting ice, are thickly clothed with Mosses. In Greenland, they constitute the most numerous class of vegetables, and Crantz, a celebrated traveller in that barren country, says he had counted above 20 species without rising from the rock whereon he was sitting. By the late expeditions to the Arctic regions, a great number of Mosses have been brought from very high latitudes; but what seems singular is, that many appear very rarely to bear fruit; for among the specimens brought home, (of which we possess the greater number,) an extremely small proportion of species, comparatively, are in a state of fructification. This circumstance gives an additional force to the argument, that what we consider the seeds of these plants are by no means *necessary* for their increase.

It is this universality, if we may so call it, of the Mosses;—this disposition in them to grow every where, even in such spots as are incapable of producing any other plants, that has much contributed towards making their study a favourite occupation with us. Upon the summits of our highest native mountains,—upon the most lofty Alps of Switzerland, and the still more elevated ones of Savoy and Piedmont,—upon the morasses and volcanic tracts of Iceland, have we received amusement and instruction, though the inexperienced eye could discover nothing more than seemingly barren wastes.

Nor is the pursuit of these vegetables confined to the summer season alone; as is the case with most other depart-

ments of Botany. The Muscologist needs not to wait for the heralds of spring to announce to him the time when he may set out, with a prospect of success, upon *his* excursions. With the Mosses it is a continual spring; a very great number of them, especially in the plains, are in the highest state of perfection in the middle of winter; and there is no season but which will afford some or other of them, in a state for examination and study.

We must now say a few words on the Genera of Mosses, which, since the time of Linnæus, who established only six, have been varying as the species have been multiplied, and as the time and attention of Botanists have been more closely directed to them. Hedwig increased the number of genera to 33, including the exotic kinds. From them we have removed those whose characters depend solely on the situation of the male flowers, and have founded our characters, in the first place, upon the absence or presence of the fringe of the *peristome*, a peculiarity which Hedwig employed to so much advantage, and, following him, Turner and Smith; secondly, on its simple or double nature; thirdly, its configuration and direction; fourthly, upon the lateral or terminal situation of the fruitstalk; and fifthly and lastly, upon the form of the Calyptra, whether dimidiate or entire, (mitriform) a character we think of great importance, to which Mr. Turner has long had recourse, but which was first publicly brought into use by that eminent German Cryptogamist, Mohr. By means of this, we see many families formed which are also grouped by natural habit. Thus is Hedwig's *Anictangium* kept separate from *Gymnostomum*, *Grimmia* from *Weissia*, *Trichostomum* from *Didymodon*, *Zygodon* from *Orthotrichum*, and *Hookeria* from *Hypnum*. We think, likewise, that scarcely a less degree of importance is to be given to the lateral and terminal situation of the fruitstalk; by the aid of which natural groups, (and these last should never be lost sight of, although in the present imperfect state of the science they must occasionally yield to more precise artificial characters,) are often

found. Thus, we presume, *Anictangium*, (the foreign *A. aquaticum*,) may be distinguished from *Hedwigia*, *Pterogonium* from *Weissia*, *Leucodon* from *Dicranum*, *Fabronia*, an exotic genus, from *Orthotrichum*, and above all, *Hypnum* from *Bryum*.

Still it must be acknowledged, that even on these principles, which may at first sight appear so clear, it will be difficult to assign characters to some genera which seem gradually to pass into each other. It is, for example, hard to pronounce if *Gymnostomum microstomum*, *G. fasciculare*, and *G. Griffithianum* really possess what should be considered a peristome. It bears the closest resemblance to that membranous ring which, in an early state, we see on the mouth of the capsule of *Weissia affinis* and *W. trichodes*; but in these two species it breaks into teeth at a more advanced period. The peristome of *Orthotrichum* presents remarkable anomalies; sometimes the teeth are in a single row and only of one kind, as *O. anomalum*; in *O. striatum* the peristome is clearly double, the narrow teeth, or ciliæ, arising from an internal membrane; whereas in most of the other species which have ciliary processes they arise on the side of the larger teeth. In *Dicranum*, the teeth are subject to vary, and to border, on the one hand, upon *Trichostomum*, and on the other, upon *Grimmia*, in which genus we find the teeth sometimes split. In *Leskea* it is difficult sometimes to see the inner membrane rising above the mouth of the capsule, and then the peristome precisely agrees with that of *Neckera*, to which perhaps the genus ought to be united. In those Mosses which make yearly shoots, these sometimes arise so near the point of insertion of the fructification, as to make the fruitstalk appear lateral, which is especially the case in the genus *Bartramia*. Even the calyptra of some Mosses seems to be intermediate, having so slight a fissure that we are doubtful which we should call that of *Cinclidotus* and of *Splachnum*;—sometimes in *Trichostomum*, besides the short fissure at the base, we see in *T. microcarpon* a single longitudinal cleft

reaching three-fourths of the way up, making it appear a truly dimidiate calyptra. Such, too, is the case with the *T. funale* of Schwaegrichen, which gave him occasion to say of it, "Calyptræ forma ab affinibus *Trichostomis* etiam recedit et rursus calyptram ad definitiones genericas adhibendum non esse, demonstrat." In this, and indeed in all the previously mentioned cases, the question is to be decided by the habit of the plant, which has thus its share of influence in the formation of genera.

As to what regards the species, although very constant in their minute characters, they, as well as other plants, vary according to exposure, soil, humidity, and elevation at which they grow, and a variety of other circumstances. It is not, therefore, surprising that these varieties should be raised to the rank of species by those who have not had it in their power to devote the time and attention necessary to the observing them, abroad, in their different places of growth, and, in the closet, to microscopical researches. Frequent leisure, various journeys, made purposely through most parts of our happy islands, and especially in the more alpine districts of Scotland and Ireland; added to a constant use of the microscope at home, in the examining of our own collections, and references to the descriptions of others, have, we hope, in many instances, enabled us to correct errors in preceding authors, to separate species from varieties, and to detect marks and characters indicative of species in what had before been undecided, or only considered as varieties of well known individuals. On the form of the leaf undoubtedly much stress is to be laid; and in its serratures, and particularly in the absence or presence, the length, the breadth, and various conformation of the nerves, so much insisted on by Mohr, characters will frequently be found when they fail in almost every other part of the plant.

But it is not solely on our own investigations that we wish to rely for many of the facts brought forward in these sheets. Several friends, both at home and abroad, have kindly contributed

specimens and remarks that have been of great use to us. As, however, these have, in every instance, been recorded under the plants, which, by their means, have been illustrated, we shall here content ourselves with acknowledging various liberal communications of the late Dr. Swartz, among foreign Botanists, and among those of our country, of Mr. Dawson Turner, whose valuable Herbarium has been freely offered to our use, and whose numerous communications and corrections have stamped a value on our book which it could not otherwise have possessed.

Since our main object in the following pages has been to assist the student of Muscology in the investigation of the species of these isles, we have given in the body of the work such generic and specific characters, and remarks upon each, as we think necessary for their discrimination, without entering into such details as would swell our book to an inconvenient size, or make it tedious by long and dry descriptions. To these we have added figures, drawn by ourselves with the utmost care, and engraved by an artist* of high talents under our immediate inspection, of every species, when necessary, both of the natural size and magnified. In some of the larger tribes, such as the *Hypna*, and a few others, whose characters are founded principally on their foliage, the leaves only have been generally represented magnified, otherwise the price of the book must have been considerably enhanced by the additional number of plates. The English language has been preferred for this work, because we know many naturalists, who pursue the study of this pleasing branch of natural history with the most unwearied industry, who are, nevertheless, in a situation of life which has precluded them from acquiring the knowledge of any but their native tongue. We have, however, given a synoptical Table of the Genera in Latin. The method here employed, is founded upon that of Lamarck and

* Mr. W. C. Edwards of London.

De Candolle, in their *Flore Françoise* and *Flora Gallica*, and such as has already been adopted in the Monograph of the *British Jungermanniæ*.

Should this Tabula not be clearly understood at first sight, a few remarks will, we hope, render it perfectly intelligible to our readers. The principle consists in presenting, in succession, pairs of opposite characters, between which the student is to choose, by a comparison with the plant, till the required genus be found. Suppose, for example, that he takes *Polytrichum* as the subject of his investigation. On having recourse to the TABULA GENERUM, he will see, by examining the mouth of the capsule, that it will not accord with the first but with the second character there given, "*Peristomio instructo*," which carries him to No. 7, where he will again compare his plant with the other character, and will be referred to No. 8. Here he will have no difficulty in discovering whether the peristome be single or double, and will consequently be carried on to No. 9, where he will, with equal facility, decide upon that character which allows more than four teeth to the peristome; and on being referred to No. 10, the second line leads his eye to No. 11, where the words "dentibus apicibus connexis" are applicable only to the plant in question; and then proceeding to No. 12, the character against *Polytrichum* will be found to be the only one that will suit his plant.

We have referred, with much pleasure, in our first edition, to the valuable "*Stirpes Cryptogamæ Vogeso-Rhenanæ, auctoribus Mougeot and Nestler*;—a work extending to 8 volumes, each of 100 species, and consisting of dried specimens of Cryptogamic Plants, which are, unquestionably, of the greatest utility to the Student of these Tribes of Plants. In Germany a somewhat similar publication has appeared, at Baireuth, entirely confined to the Mosses, under the title of "*Deutschland Moose; Ein Taschen Herbarium*," &c. or a Moss Pocket-book, by H. C. Funck. In our own country, too, Mr. Hobson of Manchester, and Mr. Drum-

mond of Forfar, N. B. (who is now engaged as a Botanist in the Land Arctic Expedition under the command of Capt. Franklin,) have published two valuable works, each in two volumes, of our Mosses; and we have referred to these as books of standard utility. It will readily be seen how much superior these collections of specimens must be, in point of accuracy, to the best of plates; and they have also the advantage of being offered to the public at a much cheaper rate.

We have given, in an APPENDIX, an account of all the known British species of Hepaticæ, with remarks upon their structure, in compliance with the wishes of many of our friends.

MUSCORUM BRITANNICORUM

GENERUM

CLAVIS ANALYTICA.

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1 { Peristomio nullo, 2.
  { Peristomio instructo, 7.

(Peristomio nullo.)

2 { Capsula quadrivalvi, — ANDRÆA. I.*
  { Capsula integra, 3.

3 { Capsula sessili, receptaculo pedicellato, — SPHAGNUM. II.
  { Capsula pedicellata, receptaculo sessili, 4.

4 { Operculo adnato, — PHASCUM. III.
  { Operculo deciduo, 5.

5 { Operculo demum laciniato, — SCHISTOSTEGA. IV.
  { Operculo integro, 6.

6 { Calyptra campanulata, — ANICTANGIUM. V.
  { Calyptra dimidiata, — GYMNOSTOMUM. VI.

(Peristomio instructo.)

7 { Peristomio simplice, 8.
  { Peristomio duplice, 23.

* *Peristomio simplice.*

8 { Peristomio e membrana conoidea plicata, — DIPHYSCIUM. VII.
  { Peristomio e dentibus vel ciliis constante, 9.

* The figures at the end of the Generic names refer to the genera as arranged in the body of the work.

9 { Dentibus quatuor, TETRAPHIS. VIII.
  { Dentibus plusquam quatuor, 10.

10 { Dentibus octo-geminatis, SPLACHNUM. IX.
   { Dentibus 16 vel pluribus, 11.

11 { Dentibus apicibus connexis, 12.
   { Dentibus apicibus liberis, 13.

12 { Dentibus 16, apicibus cohærentibus, CONOSTOMUM. X.
   { Dentibus 32, apicibus membrana horizontali connexis, POLYTRICHUM. XI.

13 { Dentibus spiraliter tortis, 14.
   { Dentibus rectis, 15.

14 { Dentibus basi per trabes connexis (fructu immerso) CINCLIDOTUS. XII.
   { Dentibus liberis vel basi membrana connexis, TORTULA. XIII.

15 { Dentibus 16, integris, 16.
   { Dentibus 16, divisis, vel triginta duobus, 20.

16 { Calyptra campanulata, vel mitriformi, 17.
   { Calyptra dimidiata, 19.

17 { Calyptra capsulam omnino tegente, 18.
   { Calyptra capsula breviore (sulcata) GRIMMIA. XV.

18 { Dentibus per paria approximatis demum reflexis, GLYPHOMITRION. XX.
   { Dentibus equidistantibus erectis, ENCALYPTA. XIV.

19 { Fructu laterali, PTEROGONIUM. XVI.
   { Fructu terminali, WEISSIA. XVII.

20 { Dentibus 16, bifidis, DICRANUM. XVIII.
   { Dentibus 16, vel 32 per paria approximatis vel basi solummodo per paria connexis, 21.

21 { Calyptra mitriformi, TRICHOSTOMUM. XIX.
   { Calyptra dimidiata, 22.

22 { Fructu laterali, LEUCODON. XXI.
   { Fructu terminali, DIDYMODON. XXII.

* * *Peristomio duplice.*

23 { Peristomio interno e ciliis liberis, 24.
   { Peristomio interno membranaceo plerumque ciliato vel e ciliis plus minusve connexis, 29.

24 { Fructu terminali, 25.
Fructu laterali, 27.

25 { Peristomii dentibus obliquis, ciliis his oppositis, FUNARIA. XXIII.
Peristomii dentibus rectis ciliis his alternantibus, 26.

26 { Calyptra dimidiata, ZYGODON. XXIV.
Calyptra mitriformi, ORTHOTRICHUM. XXV.

27 { Ciliis e membrano interno, NECKERA. XXVI.
Ciliis e dentium lateribus, 28.

28 { Calyptra dimidiata, ANOMODON. XXVII.
Calyptra mitriformi, DALTONIA. XXVIII.

29 { Peristomio interno e ciliis 16 cancellatis (fructu laterali) FONTINALIS. XXIX.
Peristomio interno basi vel omnino membranaceo, 30.

30 { Peristomio interno conico-membranaceo, BUXBAUMIA. XXX.
Peristomio interno membranaceo apice laciniato, 31.

31 { Laciniis 32, æqualibus per paria sæpissime apice et ad basin etiam connexis. TIMMIA. XXXIV.
Laciniis 16, æqualibus, vel pluribus inæqualibus, liberis, 32.

32 { Peristomii interni laciniis 16, æqualibus, bifidis (capsula plerumque globosa) BARTRAMIA. XXXI.
Peristomii interni laciniis 16 vel pluribus, integris vel perforatis, 33.

33 { Calyptra mitriformi, HOOKERIA. XXXII.
Calyptra dimidiata, 34.

34 { Fructu laterali, HYPNUM. XXXIII.
Fructu terminali, BRYUM. XXXV.

ADDENDA ET CORRIGENDA.

Page 26. *Gymnostomum Donianum.* Discovered growing upon clay slate in Glenshira, near Inverary, Argyleshire, by the *Rev. Colin Smith.*

Page 29. Of the Richardian Genus *Drepanophyllum*, Mr. Arnott observes, that it has an upright conical membranous peristome, precisely as *Leptostomum.*

Page 34. *Tetraphis Browniana.* This has been found, by *W. Borrer, Esq.*, upon sand-rocks at Eridge, Sussex, and by the *Rev. Colin Smith*, near Loch-Awe in Scotland.

Page 52. *Cinclidotus.* The Rev. Mr. Tozer, who has examined recent specimens of this Moss with great care, says, "The teeth of the peristome are a fine deep red, irregularly anastomosing at the very base, capillary, very long, being about two thirds of the length of the theca, scarcely twisted in the lower half, but most closely twisted in a spiral manner through the upper part, apparently round a broken portion of the columella; but soon after the fall of the operculum, the closely twisted part breaks off, and leaves the remainder with the slightly twisted appearance mentioned in *Musc. Brit.*

Page 76. "The Calyptra of *Weissia splachnoides* is at first mitriform and then dimidiate, (exactly as in *Splachnum,*) and is well figured by Dr. Greville, in both these states."—*Arnott, MSS.*

Page 92. *Dicranum latifolium* is not *Didymodon latifolius* of Wahlenberg and Arnott; but is the *Didymodon apiculatus* of the latter. Wahlenberg's plant is figured by Schwaegrichen as a *Cynontodium*, and is very different. *Mr. Arnott.*

Page 95. Mr. Arnott's name should have been united with those of Greville and Hooker in the discovery of the rare *Dicranum Schreberianum* at the foot of Ben-y-Gloe.

Page 105. *Trichostomum funale*, Schw. l. 6. Mr. Arnott says of this, "it is surely very different from *Tr. patens*:—at all events it is by no means the same as the *var.* β. (of this work) found in Scotland and England, which is the *Tr. patens* β. of Schwaegrichen, a large coarse plant, abundant at Fontainebleau and at Mount Louis, in the Pyrenées. *Trichostomum funale* is a slender plant, so resembling *Grimmia spiralis*, that they are only distinguished by the peristome."

Page 127. *Orthotrichum Rogeri.* The blunt leaved variety of *O. affine*, found by Mr. Drummond near Glasgow, I have compared with Bridel's original specimens of *O. Rogeri*, and find them to be the same.—*Mr. Arnott.*

Grev. Fl. Crypt. Scot. Scottish Cryptogamic Flora, &c. by R. K. Greville, vols. 1, 2, 3, 4. Edinburgh, 1824-6.

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Hedw. Sp. Hedwigii Descriptio et Adumbrationes Muscorum Frondosorum, &c. fol. vols. 1—4. Lips. 1787 et seq.

Hedw. Fund. Hedwigii Fundamentum Historiæ Naturalis Muscorum Frondosorum, 4to. Lips. 1782.

Hedw. Th. Hedwigii Theoria Generationis et Fructificationis Plantarum Cryptogamicarum, &c. ed. 2. 4to. Lips. 1798.

Hoffm. Germ. Hoffmannii, Deutschlands Flora, vols. 1—4. 12mo. Erlang. 1791 et seq.

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Hook. in Fl. Lond. Hooker in Flora Londinensis, ed. 2. 1814 et seq.

Hook. in Linn. Trans. Hooker in Transactions of the Linnæan Society of London, vol. 10. 4to.

Hook. in Kunth Syn. Pl. Œquin. Hooker in Kunth's Synopsis Plantarum Œquinoctialium Orbis Novi, v. 1. p. 7. et seq. Paris, 1822.

Hook. Fl. Scot. Flora Scottica, &c. by W. J. Hooker. London, 1821.

Hook. Musc. Exot. Musci Exotici, by W. J. Hooker. London, 1821 et seq.

Hooker and Tayl. Musc. Brit. ed. 1. Muscologia Britannica, &c. by W. J. Hooker and T. Taylor. London, 1818.

Hook. and Grev. in Brewst. Journ. of Scien. Hooker and Greville in Brewster's Journal of Science, v. 1. et seq.

Hook. Brit. Jung. Monograph of British Jungermanniæ, by W. J. Hooker. London, 1816.

Hook. in Parry's 2d Voy. Hooker, W. J., in Appendix to Capt. Parry's 2d Voyage for the Discovery of a North West Passage. London, 1825.

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Huds. Angl. Hudsoni Flora Anglica, ed. 2. 8vo. London, 1778.

Lightf. Scot. Lightfoot, Flora Scotica, 2 vols. 8vo. London, 1777.

Linn. fil. Meth. Musc. Linnæi (fil.) Method. Muscorum Illustrata, 8vo. Upsala, 1781.

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Linn. Fl. Lapp. Linnæi Flora Lapponica, ed. 2. cura Smithii, 8vo. London, 1792.

Menz. in Linn. Trans. Menzies in Transactions of the Linnæan Society of London, vol. 5.

Mohr Obs. Bot. Mohr, Observationes Botanicæ, 8vo. Kil. 1803.

Mohr and Web. Fl. Cr. Germ. Mohr et Weber, Deutschlands Kryptogamische Gewächse, 12mo. Kiel, 1807.

Mohr et Web. Suec. Mohr et Weber, Reise durch einen Theil Schweidens, 8vo. Goet. 1804.

Moug. et Nestl. Mougeot et Nestler, Stirpes Cryptogamæ Vogeso-Rhenanæ, vols. 1—8. 4to. Brugerii Vog. 1810 et seq.

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P. de Beauv. Palisot de Beauvois, Prodrome de l'Æthéogame, 8vo. Paris, 1805.

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Schkuhr, Deutschl. Moose, Deutschlands Krypt. Gewächse, &c. von Dr. Schkuhr. Wittemberg, 1810.

Schmid. Ic. Schmidel, Icones Plantarum et Analyses Partium, fol. Erlang. 1793 et seq.

Schmid. Diss. Schmidel, Dissertationes Botanicæ, &c. 4to. Erlang. 1783.

Schrad. Spicil. Schrader, Spicilegium Floræ Germaniæ, 8vo. Hannov. 1794.

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Turn. in Ann. of Bot. Turner in Annals of Botany, by König and Sims, vol. 2.

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BRITISH MOSSES.

BRITISH MOSSES.

Div. I. SCHISTOCARPI.

(CAPSULE OPENING WITH LONGITUDINAL CLEFTS.)

I. ANDRÆA.

Gen. Char. *Capsule* four-valved, the valves cohering at the extremity by means of the persistent lid; *Calyptra* irregularly torn. (Tab. I.)

This curious genus, confined wholly, we believe, to the more alpine parts of Europe, has some striking points in common with the *Jungermanniæ*, particularly in its four-valved *capsule* and irregularly torn *calyptra*; thus, as it were, connecting the *Hepaticæ* with the *Musci*. The *Capsule* has, however, a central *columella*, and is terminated by an evident, though persistent *operculum*. That part which has been considered by most authors as the *seta* or *fruitstalk*, is in fact nothing more than an elongated *receptacle* (as may be seen by our figure), upon which are observable *pistils*, and from the summit of which, at the very base of the capsule, the calyptra has its origin. Thus is the *capsule* of *Andræa* truly sessile, and the genus on that account takes a place near the *Sphagna*, among the Mosses, where we shall find the receptacle to be equally lengthened into an apparent pedicel, its flat dilated extremity bearing not only the capsule, but also the barren pistils.

All the species (and Britain possesses the whole of them) are remarkable for their dark brown or almost black colour, when seen in a mass; for each leaf, taken separately, when held up between the eye and the light, exhibits the most rich orange-brown hue; the texture is membranaceous and very compact; two, out of four species, are furnished with a nerve; the other two are destitute of nerve.

* *Leaves destitute of nerve.*

1. *A. Alpina;* stems branched, leaves obovate suddenly acuminated straight imbricating the stem on all sides. (Tab. VIII.)

Andræa Alpina. *Hedw. Sp. Musc. p.* 49. *Turn. Musc. Hib. p.* 13. *Smith. Fl. Brit. p.* 1179. *Engl. Bot. t.* 1278. *Hook. in Linn. Trans. v.* 10. *p.* 388. *t.* 31. *f.* 1. *Schwaegr. Suppl. v.* 1. *p.* 42. *Moug. et Nestl. n.* 115. *Hobson, Brit. Mosses, v.* 2. *n.* 1. *Funck, Deutschl. Moose, t.* 6. *n.* 1. *Brid. Meth. p.* 207. *Grev. and Arn. in Wern. Trans. v.* 4. *t.* 7. *f.* 1—4. *(for the fruit.). Arn. Disp. Musc. p.* 6. *Hook. Fl. Scot. P. II. p.* 120. *Drummond, Musc. Scot. v.* 2. *n.* 1.

Andræa petrophila. *Ehrh.*

Jungermannia alpina. *Linn.—Dill. Musc. t.* 83. *f.* 39.

Hab. Ireland, Wales, and Scotland, especially in alpine and subalpine districts, upon rocks, but not very common. On Ben Nevis in great abundance and perfection.

This species varies in the looseness or compactness of the growth both of its stems and leaves, and somewhat in the colour of the latter, which we have now and then seen in damp and shady situations of a pale and yellowish brown.

2. *A. rupestris;* stems branched, leaves ovate gradually acuminated, the upper ones falcate. (Tab. VIII.)

Andræa rupestris. *Hedw. Sp. Musc. p.* 47. *t.* 7. *f.* 2. *Engl. Bot. t.* 1277. *(not of Fl. Brit.). Hook. in Linn. Trans. v.* 10. *p.* 391. *t.* 31. *f.* 2. *Schwaegr. Suppl. v.* 1. *p.* 42. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 1. *Drummond, Musc. Scot. v.* 2. *n.* 3. *Arn. Disp. Musc. p.* 6.

Hab. Rocky mountainous situations throughout Great Britain.

The excellent Dr. Mohr was, we believe, the first who accurately distinguished this species, which in size most resembles *A. Rothii;* but in the structure of its leaves, and especially in the absence of a nerve, *A. Alpina.* From the latter, the form and direction of its foliage, together with the diminutive size of the whole plant, keep it sufficiently apart.

* * *Leaves furnished with a nerve.*

3. *A. Rothii;* stems almost simple, leaves lanceolato-subulate falcato-secund fragile, those of the perichætium oblong nerveless, their margins revolute. (Tab. VIII.)

Andræa Rothii. *Mohr, Fl. Crypt. Germ. t.* 11. *f.* 7—9. *Engl. Bot. t.* 2162. *Hook. in Linn. Trans. v.* 10. *p.* 393. *t.* 31. *f.* 3. *Schwaegr. Suppl. v.* 1. *p.* 43. *Moug. et Nestl. n.* 116. *Funck, Deutschl. Moose, t.* 6. *n.* 3. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 2. *Arn. Disp. Musc. p.* 6. *Drummond, Musc. Scot. v.* 2. *n.* 2.

Andræa rupestris. *Brid. Meth. Musc. p.* 206. *Turn. Musc. Hib. p.* 14. *Smith. Fl. Brit. p.* 1178.—*Dill. Musc. t.* 83. *f.* 40.

HAB. Alpine rocks, common.

4. *A. nivalis;* stems slightly branched, leaves loosely imbricated lanceolate subfalcate secund, those of the perichætium similar to the rest. (TAB. VIII.)

Andræa nivalis. *Hook. in Linn. Trans. v.* 10. *p.* 395. *t.* 31. *f.* 4. *Engl. Bot. t.* 2507. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 2. *n.* 2. *Arn. Disp. Musc. p.* 6.

HAB. On rocks upon the highest summit of Ben Nevis in Scotland, at the eastern end. Plentiful on Ben-y-mac-Duich and other mountains of the great Cairngorum range.

The present fine species has in Britain been only found at the above mentioned stations. On the most elevated of the Swiss Alps we have seen it, upon granite rocks, retaining all the characters of the Scottish specimens. In size it exceeds all the rest of the genus, and some individuals, with very falcate leaves, might almost be taken for *Jungermannia juniperina.* In its *leaves* it approaches the *Andræa* last described; but their form is lanceolate, by no means subulate; their texture thinner and softer; their colour paler; those of the *perichætium* do not differ from the cauline leaves, whilst the very reverse is the case with *Andræa Rothii,* as may be seen both by the characters and in the figures.

DIV. II. ASTOMI.

(CAPSULE WITH A PERSISTENT LID.)

II. PHASCUM.

GEN. CHAR. *Fruitstalk* terminal; *Lid* persistent; *Calyptra* dimidiate. (TAB. I.)

THIS genus comprises not only species which are amongst the most minute of the Mosses, often scarcely discernible to the naked eye; but such as are extremely dissimilar in general appearance to each other. Together with their minuteness a remarkable feature of the genus may be seen in the fruit, which, in the most advanced state, as well as at an earlier period, shows no traces of a suture, no line of separation, between the *operculum* and the *capsule*. These are continuous, and the consequence is that the seeds, or sporules, have no opportunity of escaping until the decay of the capsule, or till it bursts in age.

Some of the species are attached to *Conferva-like* branching shoots, (similar to what we believe to be the origin of *all* Mosses) as in *P. stoloniferum*. *P. alternifolium* is remarkable in the structure of its capsule. The *fruit* is sessile or pedunculated, sometimes appearing lateral from a prolongation of the stem just beneath the fructification. The *leaves* vary much in form and texture; loosely or compactly reticulated; furnished with, or destitute of, a nerve. By means of *P. bryoides* the genus is allied to *Gymnostomum*; and still more to *Voitia* of Hornschuch and to *Bruchia* of Schwaegrichen. The *former* of these two is distinguished, according to its author, by the capsule being deciduous together with the seta, (which, however, we believe to be the case with *P. bryoides*) and by its large persistent calyptra; and the *latter* in having a mitriform calyptra.

With the exception of *Phascum nervosum*, (*Musci Exotici, t.* 105. and *P. splachnoides* of *Hornsch.* in *Horæ Phys. Berol. t.* 12.—both natives of Southern Africa), all the other species are, we believe, inhabitants of the temperate parts of the northern hemisphere, always growing in a more or less tufted manner upon wall-tops, banks of earth, and in fallow-fields.

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* *Furnished with creeping, branched, conferva-like shoots.*

1. *P. serratum*; shoots branched conferva-like, perichætial leaves lanceolate deeply serrated nerveless. (TAB. V.)

Phascum serratum. *Schreb. de Phasco, t.* 2. *Smith, Fl. Brit. p.* 1156. *Hedw. Sp. Musc. p.* 23. *Engl. Bot. t.* 460. *Dicks. Crypt. Fasc.* 1. *t.* 1. *f.* 1. *Turn. Musc. Hib. p.* 4. *Funck, Deutschl. Moose, t.*

1. *n.* 10. *Brid. Meth. p.* 6. *Hook. Fl. Scot. P. II. p.* 121. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 35. *t.* 4. *f.* 1.

P. stoloniferum. *Dicks. Crypt. Fasc.* 3. *t.* 7. *f.* 2. *Smith, Fl. Brit. p.* 1157. *Engl. Bot. t.* 2006.

HAB. Shaded sandy banks.

Under this species is to be included *P. stoloniferum* of Dickson, which has already been judiciously made a variety of *P. serratum* by Mr. Turner in his Musc. Brit., and which seems to differ solely in the lower parts of the *conferva-like shoots* being browner, and the joints *there* nearly obsolete. The only leaves of this curious plant combine to form the *perichætium;* and these are liable to some variations in their serratures, and in their more or less acuminated points. The *Phascum cohærens* of Hedwig, which is incorrectly represented (*Sp. Musc. t.* 1.) with the leaves broad and nerveless, (to which, perhaps, may be added the *Phascum crassinervium* of *Schwaegrichen*, and *Nees* and *Hornsch.* and *Ph. stenophyllum* of *Voit*, although no conferva-like shoots are figured by these authors) differs from our plant in having a strong nerve.

Sprengel and *Schwaegrichen*, indeed, have looked upon the *Conferva-like shoots* as adventitious, and belonging to a real *Conferva;* but in all our numerous specimens they are unquestionably a part of the plant. The *Capsules* contain about 100 *seeds*, which are large in proportion to those of other *Phasca*, *P. alternifolium* alone excepted. These seeds are somewhat angular, rather pellucid at the angles, as if a portion of the cellular substance was still attached to the seeds. We can find no *columella;* the inner membrane is very delicate; the exterior thin and strongly marked with reticulations.

* * *Conferva-like shoots none.*

† *Leaves more or less subulate.*

2. *P. alternifolium;* stems elongated, leaves entire lanceolato-subulate remote, innovations from immediately beneath the fruit. (TAB. V.)

Phascum alternifolium. *Dicks. Crypt. Fasc.* 1. *p.* 2. *t.* 1. *f.* 2. *Smith, Fl. Brit. p.* 1157. *Engl. Bot. t.* 2107. *Schwaegr. Suppl. v.* 1. *p.* 10. *t.* 10. *Funck, Deutschl. Moose, t.* 1. *n.* 18.

Pleuridium alternifolium. *Brid. Meth. p.* 10. *(and Pl. globiferum, ejusd.) Moug. et Nestl. n.* 707. *(mixed with Ph. subulatum).*

HAB. Moist banks, rare.

This plant is remarkable for its slender lengthened shoots, the distant and alternate position of the leaves, and for the fruit being immersed in perichætial leaves, which are larger and much longer than those of the stem, and which appear to have a lateral insertion in consequence of the prolongation of the terminal shoots. Its barren stems are not unlike those of *Dicranum varium*. The *seeds* are about 16 in each capsule, very large, greenish, angular. The *capsule* itself is between membranaceous and carnose, faintly reticulated, greenish, semipellucid, so that the seeds are rendered visible within, as intended to be represented in the young state of the fruit in English Botany. Sometimes two or more *capsules* are seen in the same *perichætium*.

3. *P. crispum;* leaves lanceolato-subulate flexuose crisped when dry. (TAB. V.)

P. crispum. *Hedw. St. Cr. v.* 1. *t.* 9. *Turn. Musc. Hib. p.* 2. *Smith, Fl. Brit. p.* 1151. *Engl. Bot. t.* 1680. *Brid. Meth. p.* 9. *Moug. et Nestl. n.* 703. *Funck, Deutschl. Moose, t.* 1. *n.* 3. *Hook. Fl. Scot. P. II. p.* 121. *Arn. Disp. Musc. p.* 7. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 57. *t.* 6. *f.* 13.

P. multicapsulare. *Smith, Fl. Brit. p.* 1152. *Engl. Bot. t.* 618. *(sub nom. P. crispi).*

P. rostellatum. *Brid. Meth. p.* 9? *Nees et Hornsch. Bryol. Germ. p.* 58. *t.* 6. *f.* 14?

HAB. Banks and fields.

The *P. rostellatum* has the capsule subpedicellated and the lid rostellate; but we think it may fairly be considered a variety of *P. crispum*. Indeed *Drs. Nees and Hornschuch* look upon the *P. multicapsulare* as not specifically distinct from *rostellatum;* and *that*, we feel satisfied, is not to be distinguished from the present species.

4. *P. subulatum;* leaves subulato-setaceous straight, their nerve disappearing below the point. (TAB. V.)

Phascum subulatum. *Linn. Sp. Pl. p.* 1570. *Hedw. St. Cr. v.* 1. *t.* 35. *Turn. Musc. Hib. p.* 1. *Smith, Fl. Brit. p.* 1149. *Engl. Bot. t.* 2177. *Schwaegr. Suppl. v.* 1. *p.* 1. *Moug. et Nestl. n.* 112. *Funck, Deutschl. Moose, t.* 1. *n.* 1. *Brid. Meth. p.* 1. *Hook. Fl. Scot. P. II.*

p. 121. *Hobson, Brit. Mosses, v.* 1. *n.* 8. *Drummond, Musc. Scot. v.* 1. *n.* 5. *Arn. Disp. Musc. p.* 7. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 63. *t.* 6. *f.* 16.

P. acaule. *Dill. Hist. Musc. t.* 32. *f.* 10.

HAB. Dry banks, plentifully.

5. *P. axillare;* leaves lanceolato-subulate straight, their nerve disappearing below the point. (TAB. V.)

Phascum axillare. *Dicks. Crypt. Fasc.* 1. *p.* 2. *t.* 1. *f.* 3. *Turn. Musc. Hib. p.* 1. *Smith, Fl. Brit. p.* 1149. *Engl. Bot. t.* 1036. *Hook. Fl. Scot. P. II. p.* 122. *Hobson, Brit. Mosses, v.* 1. *n.* 7. *Arn. Disp. Musc. p.* 7. *Nees et Hornsch. v.* 1. *p.* 61. *t.* 6. *f.* 15.

P. nitidum. *Hedw. St. Cr. v.* 1. *t.* 34. *Brid. Meth. p.* 7. *Schwaegr. Suppl. v.* 1. *p.* 7. *Funck, Deutschl. Moose, t.* 1. *n.* 12.

P. strictum. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 1. *Smith, Fl. Brit. p.* 1151. *Engl. Bot. t.* 2093. *Moug. et Nestl. n.* 605. *Brid. Meth. p.* 7.

HAB. Moist banks.

This and the preceding species may be recognized from the rest of the genus by their very narrow *leaves*, and usually pale yellow colour. *P. subulatum* is distinguished from *P. axillare* by its more acuminated leaves, the greater rigidity of their texture, and their stronger nerve; hence they very much resemble bristles when seen with the naked eye. We can perceive no difference between specimens received from Mr. Dickson himself, of *P. strictum*, and our *P. axillare*. The serratures of the leaves represented by that author, appear to arise from a contraction of the marginal cellules.

†† *Leaves more or less ovate.*

\+ *Fruitstalk entirely immersed among the leaves.*

6. *P. patens;* leaves patent narrow-ovate serrated, the nerve disappearing below the point. (TAB. V.)

Phascum patens. *Hedw. St. Cr. v.* 1. *t.* 10. *Turn. Musc. Hib. p.* 2. *Smith, Fl. Brit. p.* 1150. *Engl. Bot. t.* 1279. *Schwaegr. Suppl. v.* 1. *p.* 7. *Hobson, Brit. Mosses, v.* 2. *n.* 4. *Funck, Deutschl. Moose, t.* 1. *n.* 15. *Brid. Meth. p.* 7. *(et P. Dicksoni ejusd.) Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 49. *t.* 5. *f.* 8. *Arn. Disp. Musc. p.* 7.

β. foliis angustioribus.

P. recurvifolium. *Dicks. Crypt. Fasc.* 4. *p.* 1. *t.* 10. *Brid. Meth. p.* 6. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 42. *t.* 5. *f.* 4. *(fig. good).*

P. pachycarpon *Schwaegr. Suppl. v.* 1. *p.* 4. *t.* 2. *Arn. Disp. Musc. p.* 7.

HAB. Clay fields and banks.

This plant has very patent leaves, as its name implies; moreover, these are strongly serrated, and their nerve disappears before reaching the point, circumstances which will alone suffice to keep it distinct from *P. cuspidatum*. A slight variety, the leaves being somewhat narrower, is the *P. recurvifolium* of Dicks. and Nees et Hornsch.; the *P. pachycarpon*, Schwaegr.

7. *P. muticum;* leaves broadly ovate concave acuminate more or less serrated connivent, the nerve reaching to the point.

α. Leaves sharply serrated at their points.

P. muticum. *Schreb. de Phasco, t.* 1. *f.* 11—14. *Turn. Musc. Hib. p.* 3. *Smith, Fl. Brit. p.* 1156. *Engl. Bot. t.* 2027. *Schwaegr. Suppl. v.* 1. *p.* 2. *Funck, Deutschl. Moose, t.* 1. *n.* 6. *Hook. Fl. Scot. P. II. p.* 122. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 46. *t.* 5. *f.* 6. *Arn. Disp. Musc. p.* 7.

P. acaulon *β. Linn.—Dill. Hist. Musc. t.* 32. *f.* 12.

β. minus; *leaves entire.*

HAB. Moist banks, common.—*β.* Banks near the sea at Torquay, Devonshire.

This is a species admirably distinguished by its concave and closely connivent leaves, which give the whole plant the appearance of a little bulb. We have found an extremely small variety of it at Torquay in Devonshire, which we have distinguished as above, as our var. *β.* and which approaches so nearly to the *P. Flörkeanum* of Schwaegrichen, and the *P. badium* of Nees et Hornschuch, that we can really find no other difference, except that the leaves of these latter are somewhat patent, so as to allow the fruit to be visible in a state of growth, whilst in our plant they are as connivent as in *α.* In the more common state of the species the serratures at the extremities of the leaves are subject to considerable variation; and even when quite entire, the plant may be known from *P. cuspidatum* by its much more convex leaves, and by their more rigid texture as well as more glossy surface.

8. *P. cuspidatum;* leaves ovato-acuminate erect entire, the nerve reaching to or beyond the point. (TAB. V.)

α. apiculatum; leaves apiculate.

Phascum cuspidatum. *Schreb. de Phasco, t.* 1. *f.* 1—5. *Turn.*

Musc. Hib. p. 3. *Smith, Fl. Brit. p.* 1155. *Engl. Bot. t.* 2025. *Schwaegr. Suppl. v.* 1. *p.* 1. *Moug. et Nestl. n.* 307. *Brid. Meth. p.* 8. *Funck, Deutschl. Moose, t.* 1. *n.* 4. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 70. *t.* 7. *f.* 18. *Arn. Disp. Musc. p.* 7. *Hobson, Brit. Mosses, v.* 1. *n.* 6.

P. Schreberianum. *Dicks. Crypt. Fasc.* 4. *p.* 2. *Smith, Fl. Brit. p.* 1155. *Engl. Bot. t.* 2026.

P. grandiusculum. *Brid.*

P. curvisetum. *Dicks. Crypt. Fasc.* 4. *p.* 2. *t.* 10. *f.* 4. *Smith, Fl. Brit. p.* 1154. *Engl. Bot. t.* 2259. *Brid. Meth. p.* 7.

P. carniolicum. *Web. et Mohr, Crypt. Germ. p.* 69. *Schwaegr. Suppl. v.* 1. *p.* 2. *t.* 3.

P. elatum. *Web. et Mohr, Crypt. Germ. p.* 68. *Schwaegr. Suppl. v.* 1. *p.* 9. *t.* 1. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 75. *t.* 7. *f.* 20.

P. affine. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 74. *t.* 7. *f.* 19.

P. proliferum, apiculatum, intertextum, and stellatum. *Brid.* (according to Mr. Arnott).

P. acaulon. *α. Linn. Sp. Pl. p.* 1570.

β. *piliferum*; leaves hair-pointed.

P. piliferum. *Schreb. de Phasco, t.* 1. *f.* 6—10. *Schwaegr. Suppl. v.* 1. *p.* 1. *Smith, Fl. Brit. p.* 1151. *Engl. Bot. t.* 1888. *Brid. Meth. p.* 7. *Funck, Deutschl. Moose, t.* 1. *n.* 5. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 65. *t.* 6. *f.* 17.

HAB. Hedges, fields, and moist banks.

We have here been under the necessity of differing in opinion from many esteemed authors, and uniting under one specific name several plants which have been considered distinct by them. *P. curvisetum* we conceive to be merely an accidental variety, having frequently observed in the same patch of plants individuals with curved and straight fruitstalks. *P. Schreberianum*, and *P. piliferum* seem to us to owe their characters to the soil on which they grow; the former on a rich soil and in sheltered places; the latter in barren pastures and exposed situations, with us generally near the sea, as about Yarmouth, where it is most plentiful. The leaves have always a projecting hair-like point; but this is most remarkable in the var. *piliferum*, which has quite a hoary appearance from their long white filiform extremities, similar to what we see in *Anictangium ciliatum*, and the leaves are generally short and obtuse. Mohr, whose authority is of the highest importance, retains this state of *P. cuspidatum* as a distinct species, (as do likewise Nees et Hornschuch), but

makes its character to depend on what we do not find to be constant, viz. the curvature of the fruitstalk.

The *Phascum carniolicum* of authors is figured and described as having the perichætial leaves more elongated than usual, and *P. elatum* and *P. affine* as possessing more lengthened stems; but really we find these marks so inconstant, or, as we presume, of so little importance, that we are not even disposed to allow the individuals the rank of well marked varieties.

\+ + *Fruitstalk exserted.*

9. *P. bryoides;* leaves ovate apiculate, capsule elliptical. (Tab. V.)

Phascum bryoides. *Dicks. Pl. Crypt. Fasc.* 4. *t.* 10. *f.* 3. *Smith, Fl. Brit. p.* 1154. *Engl. Bot. t.* 1180. *Schwaegr. Suppl. v.* 1. *p.* 7. *t.* 1. *Funck, Deutschl. Moose, t.* 1. *n.* 16. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 76. *t.* 7. *f.* 21. *Hook. in Fl. Lond. ed.* 2. *cum Ic. Moug. et Nestl. n.* 705. *Arn. Disp. Musc. p.* 8.

P. gymnostomoides. *Brid. Meth. p.* 7.

P. elongatum. *Schultz.*

Hab. Banks and fields, England; rare.

Size and habit of some specimens of *Gymnostomum truncatulum*; but easily distinguishable by the close union of the *lid* with the *capsule*. Still more does it resemble the rare *Voitia nivalis* of Hornschuch; indeed it might almost be taken for the same plant in miniature; and we fear that the same generic characters will, on a close examination, be found applicable to both. *P. bryoides* has never yet been found in Scotland, and even in England it is of far less frequent occurrence than in France.

10. *P. rectum;* leaves ovate with a short point, capsule globose nearly erect. (Tab. V.)

Phascum rectum. *With. Bot. Arr. p.* 771. *t.* 18. *f.* 1. *Turn. Musc. Hib. p.* 4. *Smith, Fl. Brit. p.* 1153. *Engl. Bot. t.* 330. *p.* 905. *Hobson, Brit. Mosses, v.* 2. *n.* 5. *Hook. Fl. Scot. ed.* 2. *ined. Arn. Disp. Musc. p.* 8.

Hab. Banks and fields; rare in Scotland; not uncommon in England and Ireland.

Much resembling, in general aspect, the *Weissia Starkeana*, with which it often grows intermixed, but it is distinguished by

its spherical fruit. The leaves too, are much less recurved at the margins than in that plant; and these leaves often partake of a reddish tint.

11. *P. curvicollum;* leaves narrow-ovate acuminated, capsule globose, fruitstalk curved. (Tab, V.)

P. curvicollum. *Hedw. St. Cr. v.* 1. *t.* 11. *Dicks. Crypt. Fasc.* 2. *p.* 1. *Smith, Fl. Brit. p.* 1153. *Engl. Bot. t.* 905. *(not* 330.*) Schwaegr. Suppl. v.* 1. *p.* 7. *Moug. et Nestl. n.* 606. *Funck, Deutschl. Moose, t.* 1. *n.* 13. *Hobson, Brit. Mosses, v.* 2. *n.* 5. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 55. *t.* 5. *f.* 12. *Arn. Disp. Musc. p.* 8.

Hab. Moist banks, England.

From *P. cuspidatum* this may be known by its lengthened fruitstalk, and from *P. rectum* by the curvature of that stalk, and by the more flexible, longer, and more acuminated leaves. Both in this and the last mentioned species, the *capsule* is furnished with a decided columella.

Div. III. GYMNOSTOMI.

(MOUTH OF THE CAPSULE DESTITUTE OF A PERISTOME.)

III. SPHAGNUM.

Gen. Char. *Receptacle* pedunculated, its *pedunele* resembling a *fruitstalk*. *Capsule* sessile, entire, its *lid* deciduous, its *mouth* naked; *Calyptra* irregularly torn. (Tab. I.)

In this as well as in *Andræa* the *Capsule* is sessile, being entirely destitute of a real fruitstalk. That which has been generally considered as such, is the footstalk of the receptacle, which in most of the *Sphagna* is so much lengthened out as greatly to exceed the perichætial leaves. All the species, as they are at present considered, were by Linnæus and the older Botanists comprised under the name of *S. palustre;* and most assuredly, if we take into consideration the number of intermediate varieties that have recently been discovered and described, especially by the German Botanists, we shall observe such a regular gradation, from the broadest and straightest leaved in-

dividuals to the narrowest and most falcate ones, as greatly to strengthen the opinion held by the older Muscologists, that they are but different forms of one and the same kind.

Of the 14 species instituted by Bridel, and the 9 attributed to Germany by the excellent Hornschuch and Nees, we feel quite certain that few will prove constant to their characters. We think to have steered a middle course in keeping up the four species described in the first edition of this work; not indeed that we are satisfied of the correctness of so doing; but because we think they afford the principal types under which all the others may be arranged.

All of them are aquatics, and are supposed to constitute the basis of the great bogs in our swampy and moory districts; they are remarkable for their very pale or almost white colour, tinged, however, frequently with a deep red or rose hue when the water has been dried up and has left them exposed to the action of the air and sun. The texture of the leaves is highly beautiful, extremely thin and membranous, always destitute of nerve; reticulated in the first instance, with large waved lines, and secondly, with very much smaller and delicate transverse lines, sometimes straight and sometimes curved, as is well represented in Dr. Greville's figure, *Wern. Trans. v.* 4. *t.* 7. *f.* 10, 11. The same pale colour, and in some measure the same texture, are found to exist in the *Octoblepharis albida*, and in *Dicranum glaucum*. Indeed we are confident that the *Sphagnum Javense* of Bridel and Schwaegrichen will prove to be a *Dicranum*, very nearly indeed allied to, if at all distinct from, *D. glaucum*.

As to geographical distribution, perhaps few Mosses are more universally diffused. Even in the tropics they have been found; but probably always at a considerable elevation from the level of the sea; for Humboldt, who has alone stated the elevation at which it is found in S. America, tells us the *Sph. capillifolium* grows at a height of 1050 toises upon the mountain Quindiu.

The sessile capsule and irregularly bursting calyptra, (independently of the aspect of the plants) distinguish the present genus from that of *Gymnostomum*; and the entire *capsule* and deciduous lid, from *Andræa*.

1. *S. obtusifolium;* branches tumid, leaves ovate obtuse. (TAB. IV.)

α. *vulgaris;* stems loosely tufted, 7 or 8 inches long, leaves closely imbricated.

Sphagnum obtusifolium. *Ehrh. Crypt. n.* 241. *(according to Smith). Hoffm. Germ. v.* 2. *p.* 21. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 3. *Drummond, Musc. Scot. v.* 1. *n.* 3. *Arn. Disp. Musc. p.* 6.

S. latifolium. *Hedw. Sp. Musc. p.* 27. *Turn. Musc. Hib. p.* 5. *Smith, Fl. Brit. p.* 1145. *Engl. Bot. t.* 1405. *Schwaegr. Suppl. v.* 1. *p.* 12. *Moug. et Nestl. n.* 113. *Funck, Deutschl. Moose, t.* 2. *n.* 3.

S. cymbifolium. *Swartz, Musc. Suec. p.* 19. *Brid. Meth. p.* 1. *(to which may be added S. magellanicum, tenellum, patens, and crassisetum of the same author). Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 6. *t.* 1. *f.* 1. *(excellent).*

S. contortum. *Schultz.—Funck, Deutschl. Moose, t.* 3. *n.* 6. *Nees et Hornsch. p.* 15. *t.* 11. *(sed foliis magis acutis).*

S. subsecundum. *Nees.—Funck, Deutschl. Moose, t.* 2. *n.* 5. *Nees et Hornsch. p.* 17. *t.* 7. *(foliis angustioribus et subsquarrosis).*

S. palustre. α. *Linn.—Dill. Musc. t.* 32. *f.* 1.

β. *minus;* stems densely tufted, 2 or 3 inches long, leaves closely imbricated.

S. compactum. *Schwaegr. Suppl. v.* 1. *t.* 3. *Funck. Deutschl. Moose, t.* 2. *n.* 3. *Brid. Meth. t.* 3. *(as likewise S. ericetorum and condensatum, Brid.) Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 13. *t.* 2. *f.* 5. *)good).*

γ. *fluitans;* stems much lengthened out, often 2 feet long, slender; leaves scattered, remote.

S. latifolium. β. *fluitans. Turn. Musc. Hib. p.* 6.

S. immersum. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 11. *t.* 2. *f.* 4.

HAB. Bogs and still pools, most abundant.

We look upon our α. *vulgaris* of the *S. obtusifolium*, to be the most decidedly marked *broad leaved state* of the genus, from whence a gradation may be observed to that species with the narrowest leaves, as in *S. cuspidatum*. Already we find in some of the varieties enumerated above, as may be seen by *Nees and Hornschuch's* admirable figures, an approach to the *S. squarrosum* and *S. acutifolium*, which come next to be enumerated, enough indeed to make us cautious in multiplying the species unnecessarily.

The occasional erosion of the tips of the leaves in the *S. compactum*, described and figured by *Schwaegrichen*, is a cir-

cumstance to be attributed to the exposure of the plant and its frequent vicissitudes of temperature; and can assuredly yield no character of importance. The *Sphagnum oblongum* of *Palisot de Beauvois*, is probably the same state of the plant. A singular appearance of this species, not noticed above, is that which has been found by Dr. Greville in pools of water in a peat moss near Edinburgh, where the stems attain the length of a foot and a half, are almost entirely simple, and, for the greater part, destitute of leaves.

It may here be observed that the *Sph. subsecundum* and *tenellum* of Nees and Hornschuch seem to connect our *S. obtusifolium* with *S. squarrosum*, as the *S. contortum* of Schultz does with *S. acutifolium*.

2. *S. squarrosum*; branches attenuated at the extremities, leaves ovato-acuminate squarrose recurved. (Tab. IV.)

Sphagnum squarrosum. *Web. et Mohr, It. Suec. t.* 2. *f.* 1. *a. b. Engl. Bot. t.* 1498. *Schwaegr. Suppl. v.* 1. *p.* 13. *Brid. Meth. p.* 2. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 9. *t.* 1. *f.* 3. *Moug. et Nestl. n.* 209. *Funck, Deutschl. Moose, t.* 3. *n.* 4. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 5. *Drummond, Musc. Scot. v.* 2. *n.* 4. *Arn. Disp. Musc. p.* 6.

Hab. Bogs, not rare.

Scarcely is this species to be distinguished from the preceding one, but by its more acuminated leaves, and by their being bent back in so remarkable a manner as to give the whole plant a very squarrose appearance.

3. *S. acutifolium*; branches attenuated, leaves ovato-lanceolate crowded. (Tab. IV.)

Sphagnum acutifolium. *Ehrh. Crypt. n.* 72. *(according to Smith.) Schwaegr. Suppl. v.* 1. *p.* 15. *t.* 5. *Funck, Deutschl. Moose, t.* 3. *n.* 8. *Hook. Fl. Scot. P. II. p.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 4. *Drummond, Musc. Scot. v.* 1. *n.* 1. *Arn. Disp. Musc. p.* 6. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 19. *t.* 3. *f.* 8. *Hook. in Kunth. Syn. Pl. Œquin. v.* 1. *p.* 46.

S. capillifolium. *Hedw. Sp. Musc. p.* 28. *Smith, Fl. Brit. p.* 1146. *Engl. Bot. t.* 1406. *Moug. et Nestl. n.* 11. *Brid. Meth. p.* 2. *(S. pentastichon of the same author, and S. recurvum of Palisot de Beauvois, which have the extremities of their leaves slightly recurved, and S. subulatum, Brid.).*

S. intermedium. *Hoffm. Germ. v.* 2. *p.* 22.

S. palustre, β. *Linn.—Dill. Musc. t.* 32. *f.* 2. A.

HAB. Bogs, extremely common.

4. *S. cuspidatum;* branches attenuated, leaves lanceolato-subulate lax. (TAB. IV.)

Sphagnum cuspidatum. *Ehrh. Crypt. n.* 25. *(according to Smith.) Smith, Fl. Brit. p.* 1147. *Engl. Bot. t.* 2392. *Schwaegr. Suppl. v.* 1. *p.* 16. *t.* 6. *Turn. Musc. Hib. p.* 6. *Moug. et Nestl. n.* 405. *Hobson, Brit. Mosses, v.* 2. *n.* 3. *Funck, Deutschl. Moose, t.* 3. *n.* 7. *Drummond, Musc. Scot. v.* 1. *n.* 2. *Hook. Fl. Scot. P. II. p.* 121. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 23. *t.* 4. *f.* 9. *Arn. Disp. Musc. p.* 6. *—Dill. Musc. t.* 32. *f.* 2. B.

HAB. Bogs, not uncommon, generally found growing entirely under water; rare in fruit.

In this, as well as in the foregoing species, there are varieties with more or less squarrose leaves.

The difficulty of detecting this plant in fructification, joined to its being usually found wholly immersed in water, affords a strong reason for considering this as a mere variety of *S. acutifolium*, arising from situation. Even in the same plant the leaves are found to vary; the lower leaves upon the branch being often shorter and broader, and the upper ones more lengthened and narrow. Specimens of this plant, four feet long and with the leaves three-fourths of an inch in length, have been found by Dr. Greville; but in this state it never bears fruit.

The *Sphagnum simplicissimum, (Bridel Meth. p.* 3.*)* Mr. Arnott suspects to be an *Orthotrichum.*

IV. GYMNOSTOMUM.

GEN. CHAR. *Fruitstalk* terminal; *mouth* of the *capsule* naked, or at most, in an early stage, closed with a more or less completely formed horizontal membrane; *Calyptra* dimidiate. (TAB. I.)

We noticed in the first edition of this work, published in 1819, the presence of a delicate, horizontal, annular membrane in the mouth of the capsule of some of the *Gymnostoma*, when examined

in a fresh state; such as *G. microstomum*, *G. fasciculare*, *G. truncatulum*, and especially in *G. Griffithianum*, in which this membrane is not unfrequently entire; without, however, in the least considering it to invalidate the character of the genus. Nay, we are disposed to go further, and to believe, from subsequent observations of ourselves and others, that such a membrane in an early state of the plant may be found in *all* of the genus. As to the exact origin of this membrane, whether it is attached as a covering to the columella, or whether it springs from the very inner membrane or edge of the mouth of the capsule, as the teeth in *Weissia* for instance, or *Tortula*, are found to do, we confess we have not been able entirely to satisfy ourselves. Whilst, however, it constitutes nothing but this horizontal membrane, disappearing partly or entirely after the fall of the *operculum*, we consider it of no importance in the generic character; hence we can by no means consent to adopt the *Œdipodium* of Schwaegrichen, however different that plant may be in habit from the other *Gymnostoma*, nor the *Hymenostomum* of our illustrious countryman *Brown*, (and adopted by *Nees and Hornschuch*), and which quite agrees in habit with some well known *Gymnostoma*.

Sometimes an oral membrane in the Mosses destitute of real teeth, takes another character; it forms an erect annulus after the fall of the *operculum*, sometimes having regular plicæ and itself of great length, as in *Diphyscium*; at another time breaking into a definite number of teeth,* and that number corresponding with the number we find to be so common in the Mosses furnished with real teeth, as in our *Weissia trichodes;* we then consider that such mosses should be removed from *Gymnostomum*.

A third kind of membrane at the mouth of the capsule remains to be noticed, which is that, where it forms a short *upright* annulus more or less jagged at the margin, but without any regu-

* An *appearance* of this kind has indeed been described and figured by Dr. Hooker in *Leptostomum erectum*, *Br. Musc. Ex. t.* 169.; and Dr. Greville and Mr. Arnott in their *Tent. Meth. Musc. 2d. Mem.* state that they have seen a similar division of the membrane to occur in *Gymn. microstomum*. If these authors have not been deceived, then they may afford some further character for distinguishing these plants from *Gymnostomum* than has yet been known.

larity; as in *Leptostomum* of *Mr. Brown*, and *Drepanophyllum* of *Richard*, in *Hook. Musci Exotici*. Here the character comes so near to that which we have been describing to exist in most or all of the true *Gymnostoma*, that for our own parts we do not see how it can advantageously be taken into account in constituting a generic character.

In offering these remarks, we are of course considering the Mosses solely under the artificial arrangement in which the *peristome* holds the first place. In looking upon many of the plants above alluded to in what concerns their natural disposition; then assuredly, *Drepanophyllum*, *Œdipodium* and *Leptostomum* will be far removed from the great mass of the *Gymnostoma*.

* *Stems elongated, branched.*

1. *G. lapponicum;* leaves linear-lanceolate crisped when dry, those of the perichætium broadly ovate convolute, capsule turbinate sulcated. (TAB. VI.)

Gymnostomum lapponicum. *Hedw. St. Cr. v.* 3. *t.* 5. A. *Smith, Fl. Brit. p.* 1167. *Engl. Bot. t.* 2216. *Moug. et Nestl. n.* 309. *Drummond, Musc. Scot. v.* 1. *n.* 7. *Hook. Fl. Scot. P. II. p.* 122. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 180. *t.* 11. *f.* 27. *Arn. Disp. Musc. p.* 9.

Anictangium lapponicum. *Hedw. Sp. Musc. p.* 40. *Schwaegr. Suppl. v.* 1. *p.* 26. *Funck, Deutschl. Moose, t.* 5. *n.* 3.

Schistidium striatum. *Brid. Meth. p.* 22.

Bryum lapponicum. *Dicks. Pl. Crypt. Fasc.* 4. *p.* 10.

HAB. On rocks in alpine situations. Abundant in the crevices of the schistose rocks near the summits of the Scottish mountains.

This and the following species in their elongated and ramified stems have the habit of *Anictangium*, and distinct perichætial leaves. The *Calyptra* is, however, dimidiate, and hence we prefer retaining them in the genus *Gymnostomum*. The leaf is dotted, the nerve pale.

The present individual was long supposed to be of rare occurrence; but those Botanists who are in the habit of visiting the summits of the high mountains in Scotland, have no difficulty in discovering this elegant little moss, nestled, as it were, in the shady clefts of moist rocks, in such situations as will

hardly admit the hand to remove it, and generally bearing abundance of fructification. *Mr. Drummond* finds it in Clova; *Mr. Trevelyan* upon Craig-calleach, and, generally speaking, it is in more abundance on the schistose rocks, (probably on account of their greater moisture, and more abundant soil,) than on any others.

2. *G. æstivum;* leaves lanceolate twisted when dry, those of the perichætium broadly ovate convolute, capsule oblong smooth. (TAB. VI.)

Gymnostomum æstivum. *Hedw. Sp. Musc. t. 2. f. 4—7. Schwaegr. Suppl. v. 1. p. 30. Brid. Meth. p. 18. Hook. Fl. Scot. P. II. p. 122. Hobson, Brit. Mosses, v. 2. n. 6. Nees et Hornsch. Bryol. Germ. v. 1. p. 174. t. 11. f. 25. Arn. Disp. Musc. p. 9. Drummond, Musc. Scot. v. 2. n. 5.*

G. luteolum. *Engl. Bot. t. 220. (not of Fl. Brit. according to Mr. Davies' specimens.)*

G. tristichon. *Wahl. Lapp. p. 303.*

Anictangium compactum. *Schwaegr. Suppl. v. 1. p. 36. t. 11. Brid. Meth. p. 23. Funck, Deutschl. Moose, t. 5. n. 5.*

HAB. On wet rocks, especially near water-falls.

The stems are from one to three or four inches in length, and very densely tufted and matted together; the leaves short and somewhat rigid, dotted, pale in the nerve; but not, as it appears to us, constantly trifarious in their insertion, as stated by Wahlenberg and others.

3. *G. viridissimum;* leaves broadly lanceolate, capsule ovate, lid oblique rostrate. (TAB. VI.)

Gymnostomum viridissimum. *Smith, Engl. Bot. t. 1583. Hook. Fl. Scot. P. II. p. 122. Arn. Disp. Musc. p. 9.*

Dicranum viridissimum. *Smith, Fl. Brit. p. 1224. Turn. Musc. Hib. p. 71.*

Grimmia? Forsteri. *Smith, Fl. Brit. p. 1196. Engl. Bot. t. 2225.*

Bryum Forsteri. *Dicks. Crypt. Fasc. 3. p. 4. t. 7. f. 8.*

Weissia Forsteri. *Brid. Meth. p. 45.*

HAB. Trees, principally in the south of England; rare in Scotland; where, I believe, it has never been found in fruit. *Mr. D. Don* has found it *upon rocks* in Inch Keith; *Capt. Carmichael* in the same situation in Appin, and *Mr. Drummond* in the Den of Airly, and Den of Rechip.

In the circumstance of its being generally found upon trees, this species is unlike the remaining British congeners. It is produced in tufts like an *Orthotrichum*. The *stems* are scarcely an inch in height, of a pale yellow green. The *leaves* are most beautifully dotted, and the nerve more decidedly pale than in the preceding species, and almost exactly resemble those of *Zygodon conoideum*.

We believe that none but very imperfect specimens of Smith's *Grimmia? Forsteri* exist; but on an accurate examination of their leaves we have little hesitation in referring that plant to our *Gym. viridissimum*.

This species we think is unknown upon the continent.

4. *G. curvirostrum;* leaves lanceolato-subulate erect rigid straight when dry, capsule (brown) broadly ovate, lid obliquely rostrate longer than the capsule. (TAB. VI.)

Gymnostomum curvirostrum. *Hedw. St. Cr. v. 2. t. 24. Smith, Fl. Brit. p. 1164. Engl. Bot. t. 2214. Schwaegr. Suppl. v. 1. p. 32. Brid. Meth. p. 18. Hook. Fl. Scot. P. II. p. 122. Drummond, Musc. Scot. v. 1. n. 8. Nees et Hornsch. Bryol. Germ. v. 1. p. 170. t. 11. f. 24. Arn. Disp. Musc. p. 9.*

G. stelligerum. *Schrad. Journ. v. 2. p. 55. (Sm.) Smith, Fl. Brit. p. 1164. Brid. Meth. p. 18.*

G. luteolum. *Smith, Fl. Brit. p. 1163. (not of Engl. Bot.).*

G. pomiforme. *Nees et Hornsch. Bryol. Germ. v. 1. p. 158. t. 10. f. 18.* (together with *G. æruginosum, microcarpon, brevisetum,* and *pallidisetum* of the same authors, according to *Mr. Arnott*).

Bryum æstivum. *Linn.*

Bryum stelligerum. *Dicks.*

HAB. Moist rocks, especially such as are calcareous.

5. *G. rupestre;* leaves linear-subulate patent flaccid flexuose twisted when dry, capsule (pale) ovate, lid conico-rostrate shorter than the capsule. (SUPPL. TAB. II.)

G. rupestre. *Schwaegr. Suppl. v. 1. p. 31. t. 10. Drummond, Musc. Scot. v. 2. n. 6. Brid. Meth. p. 18. Nees et Hornsch. Bryol. Germ. v. 1. p. 155. t. 10. f. 16. Funck, Deutschl. Moose, t. 7. n. 4. Arn. Disp Musc. p. 9.*

G. curvirostrum. *Hobson, Brit. Mosses, v. 1. n. 9.*

G. æruginosum. *Smith, Fl. Brit. p. 1163. Engl. Bot. t. 2200. Brid. Meth. p. 18.*

G. articulatum. *Brid. Meth. p. 18. (according to Arnott). Nees et Hornsch. Bryol. Germ. v. 1. p. 156. t. 10. f. 17.?*

G. stelligerum. *Nees et Hornsch. Bryol. Germ. v. 1. p. 168. t. 11. f. 23. (according to Arnott).*

Dicranum hyperboreum. *Brid. Meth. p.* 67. *(Arnott).*

HAB. Wet dripping rocks, not uncommon.

The difficulty of distinguishing the present from the preceding species, it must be acknowledged, is in many cases very great; and we are ready to confess that in the first edition of this work we ourselves have confounded them. Schwaegrichen's figure of the *G. rupestre* is, indeed, very satisfactory; and in Drummond's Musci Scotici are published, as above quoted, what we consider to be the true *G. rupestre*, and *G. curvirostrum*. The former is of a much deeper green; the leaves are considerably longer, more linear, flaccid, flexuose or twisted, both in a dry and moist state; the nerve is thick; the capsule narrower, of a pale yellow brown, and the lid is less suddenly rostrate and less oblique. Still we must allow that we have seen intermediate states that have made us hesitate upon the propriety of separating them; and if the figures of Nees and Hornschuch, referred to in the synonyms of the two species, be carefully compared, a series will be found that appear to unite the two extremes of one and the same species.

We are not sure even whether future observations on the noble *Gymnostomum Hornschuchianum* (erroneously figured as a *Hedwigia* in *Hook. Musc. Exot. v.* 2. *p.* 103.) of *Nees and Hornschuch, Bryol. Germ. t.* 11. *f.* 26. will not prove it to be a very luxuriant state of *G. rupestre*. In all the essential characters it certainly agrees.

** *Stems short, scarcely branched.*

6. *G. Griffithianum;* leaves obovato-rotundate strongly reticulated, their nerve disappearing below the summit, fruitstalk thick succulent, lid hemispherical. (TAB. VII.)

Gymnostomum Griffithianum. *Smith, Fl. Brit. p.* 1162. *Engl. Bot. t.* 1938. *Hook. Fl. Scot. ed.* 2. *ined. Drummond, Musc. Scot. v.* 1. *n.* 9.
Œdipodium Griffithianum. *Schwaegr. Suppl. v.* 1. *t.* 105.
Bryum Griffithianum. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 10.
Splachnum Fœlichianum. *With. and Hull, (according to Smith).*

HAB. In the crevices of rocks upon elevated mountains in England, Wales, and Scotland.

This is a very rare and a very remarkable plant, with a good deal of the habit of a *Splachnum*, but with a fruitstalk very thick,

as cellular, and nearly as white and delicate as that of a *Jungermannia*. We were so fortunate as to meet with it last year (1825) amongst the steep, precipitous rocks of Ben Nevis, in considerable plenty. Patches of earth of some inches in diameter were covered with the beautiful yellow green of its large foliage, and the numerous setæ were gradually thickened upwards so as to pass almost imperceptibly into the capsule. No one can have an idea of the beauty and delicacy of texture of this plant who has not seen it growing; for from its highly juicy nature it turns almost black in drying.

Schwaegrichen's character for his *Œdipodium*, "Peristomium nullum aut exigua membranula indivisa; Flos hermaphroditus, terminalis," seems to offer no mark of distinction whatever from *Gymnostomum*, where we prefer retaining this moss, unlike as it is in habit to the rest of the genus. The membrane across the mouth of the capsule is only to be seen in the fresh state of the plant. Obovate bodies are imbedded at the base of some of the leaves in a clustered manner, such as we find in many *Jungermanniæ*, and they may probably be considered as *gemmæ*. The plant was first found on the English mountains, (Ingleborough, Yorkshire,) by the Rev. Mr. Dalton, and Dr. Hooker; and it was from specimens there gathered, (and not upon Ben Lawers as Sir James Smith has mentioned by mistake,) that the figure in English Botany was taken. *Mr. Don* was the first to discover it in Scotland, on the Clova mountains; where we have also gathered it in company with Mr. Drummond.

The stems of this and all the remaining species of the genus, scarcely exceed half an inch in length.

7. *G. ovatum;* leaves ovate erect concave piliferous, their nerve furnished with a granuliferous membrane, lid rostrate. (Tab. VII.)

a. vulgare; *capsule ovate.*

Gymnostomum ovatum. *Hedw. St. Cr. v.* 1. *t.* 6. *Smith, Fl. Brit. p.* 1160. *Engl. Bot. t.* 1889. *Turn. Musc. Hib. p.* 9. *Moug. et Nestl. n.* 308. *Hobson, Brit. Mosses, v.* 2. *n.* 7. *Schwaegr. Suppl. v.* 1. *p.* 27. *Funck, Deutschl. Moose, t.* 4. *n.* 3. *Drummond, Musc. Scot. v.* 2. *n.* 8. *Hook. Fl. Scot. P. II. p.* 122. *Brid. Meth. p.* 12. *Arn. Disp. Musc. p.* 10. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 128. *t.* 9. *f.* 5.

β. gracile; *capsule oblong.*

HAB. Banks and walls.

This is a species which varies much in the length of the fruit-stalk, and also of its capsule; but it may always be known by its concave, obtuse, and piliferous leaves; and especially by the nerve of these, which in the upper part is furnished with a single, and sometimes a double, large, oblong, membranous appendage, to the surface of which are attached minute greenish bodies, probably *gemmæ*. This peculiarity appears to have been unnoticed by all preceding Muscologists, except Hedwig, and that admirable author has both described and figured it in his *Stirpes Crypt.*

8. *G. truncatulum;* leaves ovate apiculate patent rigid entire nearly plane, capsule ovate or turbinate, lid obliquely rostrate. (TAB. VII.)

α. *capsule turbinate.*

Gymnostomum truncatulum. *Hoffm. Germ. v.* 2. *p.* 27. *Turn. Musc. Hib. p.* 7. *Smith, Fl. Brit. p.* 1158. *Engl. Bot. t.* 1975. *Hobson, Brit. Mosses, v.* 1. *n.* 10. *Drummond, Musc. Scot. v.* 1. *n.* 12. *Hook. Fl. Scot. P. II. p.* 122. *Arn. Disp. Musc. p.* 10.

G. truncatum. *Hedw. St. Cr. v.* 1. *t.* 5. *Schwaegr. Suppl. v.* 1. *p.* 19. *Brid. Meth. p.* 15. *Funck, Deutschl. Moose, t.* 4. *n.* 7. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 132. *t.* 9. *f.* 6. *Moug. et Nestl. n.* 114.

Bryum truncatulum. *Linn.—Dill. Hist. Musc. t.* 45. *f.* 7. F.—K.

β. *capsule ovate, or oblong.*

G. intermedium. *Turn. Musc. Hib. p.* 7. *t.* 1. *f. a. Smith, Fl. Brit. p.* 1159. *Engl. Bot. t.* 1976. *Funck, Deutschl. Moose, t.* 4. *n.* 8. *Brid. Meth. p.* 15. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 135. *t.* 9. *f.* 7.

G. rufescens. *Brid. Meth. p.* 12. *(fide Arn.). Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 121. *t.* 9. *f.* 1.

Dill. Hist. Musc. t. 45. *f.* 7. A.—E.

HAB. On banks, walls, and in fallow-fields.

A variety of *G. truncatulum*, with the stem branched in a fasciculated manner, with six to eight branches, each branch bearing a capsule, has been found both by *Mr. Lyell*, and *Dr. Greville.*

9. *G. Heimii;* leaves lanceolate serrated at the point, lid obliquely rostrate. (TAB. VII.)

Gymnostomum Heimii. *Hedw. St. Cr. v.* 1. *t.* 30. *Turn. Musc. Hib. p.* 9. *Smith, Fl. Brit. p.* 1162. *Schwaegr. Suppl. v.* 1. *p.* 2. *Brid. Meth. p.* 15. *Hobson, Brit. Mosses, v.* 2. *n.* 8. *Hook. Fl. Scot. P. II.*

p. 123. *Drummond, Musc. Scot. v.* 2. *n.* 12. *Arn. Disp. Musc. p.* 10. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 138. *t.* 9. *f.* 8.

G. obtusum. *Hedw. Sp. Musc. t.* 2. *f.* 1—3. *Turn. Musc. Hib. p.* 9. *Smith, Fl. Brit. p.* 1159. *Engl. Bot. t.* 1407. *Schwaegr. Suppl. v.* 1. *p.* 21. *Brid. Meth. p.* 15.

G. intermedium. *Schwaegr. Suppl. v.* 1. *p.* 19. *t.* 7. *(nec aliorum).*

G. affine. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 140. *t.* 9. *f.* 9.

HAB. Moist banks and grassy pastures, especially near the sea.

Very nearly allied to *G. truncatulum*; but generally of much larger and stronger growth, the leaves more rigid, narrow, and serrated at the extremity. We can perceive no difference whatever between the *G. obtusum* and *G. Heimii* of Hedwig, and have hence retained the latter as the older name. Schwaegrichen's *G. intermedium* we have referred to the present plant rather than to *G. truncatulum*, in consequence of the serrated, or denticulated leaves.

10. *G. conicum;* leaves oblongo-ovate apiculate, capsule more or less ovate, lid conical. (TAB. VII.)

α. capsule ovate.

Gymnostomum conicum. *Schwaegr. Suppl. v.* 1. *p.* 26. *t.* 9. *Brid. Meth. p.* 13. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 127. *t.* 9. *f.* 4.

β. capsule turbinate.

G. minutulum. *Schwaegr. Suppl. v.* 1. *p.* 25. *t.* 9. *Brid. Meth. t.* 12. *Funck, Deutschl. Moose, t.* 4. *f.* 6. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 123. *t.* 9. *f.* 2.

HAB. Fields near Cork. *Mr. Drummond.* Too frequent in the Botanic Garden, Dublin. *J. T. Mackay, Esq.*

Having recently seen this plant growing about Cork in considerable plenty, along with *Phascum rectum*, and observing the differences in the form of the capsule to be found among them, we confess ourselves unable to discover any mark of distinction between it and *G. minutulum*. It is among the most minute of the genus, and by this particular, as well as from the very different form of the lid, it may be always known from *G. truncatulum*.

Without viewing carefully the mouth of the capsule, this moss may be mistaken for small plants of *Weissia Starkeana*.

11. *G. fasciculare;* leaves oblongo-acuminate nearly plane sub-

serrated marginated, capsule pyriform, lid plane submammillate. (TAB. VII.)

Gymnostomum fasciculare. *Hedw. Sp. Musc. t. 4. f. 5—9. (bad). Turn. Musc. Hib. t. 10. Smith, Fl. Brit. p. 1165. Engl. Bot. t. 1245. Schwaegr. Suppl. v. p. 24. Moug. et Nestl. n. 607. Hobson, Brit. Mosses, v. 2. n. 9. Funck, Deutschl. Moose, t. 4. f. n. 11. Drummond, Musc. Scot. v. 2. n. 9. Hook. Fl. Scot. P. II. p. 123. Brid. Meth. p. 15. Nees et Hornsch. v. 1. p. 141. t. 10. f. 10. Arn. Disp. Musc. p. 10.*

G. Rottleri. *Schwaegr. Suppl. v. 1. p. 24. t. 3. (according to Arnott).*

Bryum fasciculare. *Dicks.*

Bryum Ægypti. *Hasselquist?*

Bryum attenuatum. *Brid. Meth. p. 117. (fide Arn.).*

Hyssopus Salomonis. *Linn. Sp. Pl. p. 1584. (sub Bryo truncatulo, according to Smith).*

HAB. Moist banks.

12. *G. pyriforme;* leaves ovato-acuminate concave serrated not marginated, capsule roundish obovate, lid convex shortly rostrate. (TAB. VII.)

Gymnostomum pyriforme. *Hedw. Sp. Musc. p. 38. Turn. Musc. Hib. p. 11. Smith, Fl. Brit. p. 1166. Engl. Bot. t. 413. Moug. et Nestl. n. 13. Brid. Meth. p. 14. Hook. Fl. Scot. P. II. p. 123. Schwaegr. Suppl. v. 1. p. 24. Funck, Deutschl. Moose, t. 4. n. 10. Hobson, Brit. Mosses, v. 2. n. 11. Drummond, Musc. Scot. v. 1. n. 11. Nees et Hornsch. Bryol. Germ. v. 1. p. 144. t. 10. f. 11. Arn. Disp. Musc. p. 10.*

G. turbinatum, dilatatum, and splachnoideum. *Brid. Meth. p. 14. (according to Arnott).*

Bryum pyriforme. *Linn.—Dill. Hist. Musc. t. 44. f. 6.*

HAB. Wet banks and ditches, abundant.

We trust that the above characters will be found sufficient for distinguishing the *G. pyriforme*, and *G. fasciculare*, which in many respects bear a considerable resemblance to each other. —Both have the same thin delicate leaves with large reticulations. The present species is the larger and stouter plant of the two.

13. *G. tenue;* stem scarcely any, inferior leaves very short ovato-lanceolate, superior linear-lanceolate, all of them erect obtuse with a strong nerve disappearing below the point, capsule oblong. (TAB. VII.)

Gymnostomum tenue. *Hedw. Sp. Musc. t. 4. f. 1—4. Schwaegr. Suppl. v. 1. p. 27. Funck, Deutschl. Moose, t. 4. n. 12. Hook. Fl.*

Scot. P. II. p. 123. *Hobson, Brit. Mosses, v.* 2. *n.* 12. *Drummond, Musc. Scot. v.* 2. *n.* 11. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 151. *t.* 10. *f.* 14. *Brid. Meth. p.* 13. *Arn. Disp. Musc. p.* 11.

G. paucifolium. *Engl. Bot. t.* 2506.

Dicranum cylindricum. *Smith, Fl. Brit. p.* 1221.

Bryum paucifolium. *Dicks. Crypt. Fasc.* 4. *t.* 11. *f.* 3.

HAB. On sandstone rocks, rare.

The present species is remarkable in having two kinds of leaves, of which the outer or lower ones are much the shortest and broadly lanceolate, whilst the inner and uppermost are linear-lanceolate; both kinds are nearly plane, very obtuse at the point. The *capsule* is cylindrical, and the lid conical and somewhat acuminated, in which particular it seems to differ from the *Gymnostomum gracillimum* of *Nees* et *Hornschuch.*

14. *G. Donianum;* stem scarcely any, leaves subulate, capsule turbinate. (TAB. VII.)

Gymnostomum Donianum. *Engl. Bot. t.* 1582. *Hobson, Brit. Mosses, v.* 2. *n.* 10. *Drummond, Musc. Scot. v.* 2. *n.* 10. *Hook. Fl. Scot. P. II. p.* 123. *Arn. Disp. Musc. p.* 10.

HAB. Sandstone rocks, Scotland. In the Den of Dupplin. *Mr. G. Don.* Den of Airly, and at Norran Water. *Mr. Drummond.*

A very minute, delicate, and slender moss. The leaves quite setaceous to the naked eye; the seta, or fruitstalk, pale, as are the capsule and the lid; the former is exactly turbinate; the latter hemispherical with an acuminated point. The *columella* is exserted as in some *Splachna.*

G. Donianum seems to be entirely unknown upon the continent; and even in Britain is, we believe, wholly confined to the spots above mentioned; where, however, it grows in great profusion, clothing the surface of sandstone rocks to a considerable extent, as *Weissia calcarea* does the chalk cliffs in England.

15. *G. microstomum;* leaves broadly subulate, their margins involute above the middle, flexuose crisped when dry, capsule elliptical contracted at the mouth, lid subulate incurved. (TAB. VII.)

Gymnostomum microstomum. *Hedw. St. Cr. v.* 3. *t.* 30. *Smith, Fl. Brit. p.* 1165. *Engl. Bot. t.* 2215. *Schwaegr. Suppl. v.* 1. *p.* 28. *Funck, Deutschl. Moose, t.* 4. *n.* 13. *Brid. Meth. p.* 15. *Hook. Fl.*

Scot. P. II. p. 123. *Drummond, Musc. Scot. v.* 1. *n.* 10. *Arn. Disp. p.* 10. *Moug. et Nestl. n.* 608.

G. rutilans. *Hedw. Sp. Musc. t.* 3. *f.* 8—11.

Hymenostomum microstomum. *Brown,* in *Linn. Trans. v.* 12. *p.* 572. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 199. *t.* 12. *f.* 4.

Hymenostomum rutilans. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 201. *t.* 12. *f.* 5.

Hymenostomum brachycarpum. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 196. *t.* 12. *f.* 3.—*(to which may probably be added of the same author* Hymenostomum squarrosum, *p.* 193. *t.* 12. *f.* 1. H. obliquum, *p.* 194. *t.* 12. *f.* 2. H. subglobosum, *p.* 203. *t.* 12. *f.* 6. *and* crispatum, *p.* 204. *t.* 12. *f.* 7.*)*

HAB. Banks, not unfrequently, especially in subalpine countries.

We have already stated our opinion with regard to the genus *Hymenostomum;* and we have to regret that as we are unable to coincide with *Mr. Brown,* and *Nees et Hornschuch* in believing it to be well founded, so we are equally at variance with the authors last mentioned with respect to the species they have enumerated. We appeal to the figures given in the *Bryologia Germanica,* and we would ask, on the very face of them, if they have not, one and all, rather the appearance of the same plant in different stages of growth, or varying from soil, situation, &c. than of distinct species.

V. ANICTANGIUM.

GEN. CHAR. *Fruitstalk* terminal; mouth of the *Capsule* naked; *Calyptra* mitriform. (TAB. I.)

Of this genus the only two species, if such they can be called, that are found in Britain, have their leaves destitute of nerve, and the capsule immersed in the perichætial leaves. We consider the genus to be distinguished from *Gymnostomum,* mainly, by the *mitriform calyptra. Hedwigia,* we would propose, should be confined to those Mosses *without a peristome,* which have a *lateral fruitstalk.*—Our present genus is the *Schistidium* of Bridel, and Hornschuch and Nees.

1. *A. ciliatum;* leaves ovate much lengthened out and diaphanous at their points, those of the perichætium laciniated at the extremity. (TAB. VI.)

Anictangium ciliatum. *Hedw. Sp. Musc. p.* 40. *Turn. Musc. Hib. p.* 11. *Schwaegr. Suppl. v.* 1. *p.* 38. *Hook. Fl. Scot. P. II. p.* 123. *Funck, Deutschl. Moose, t.* 5. *n.* 1. *Hobson, Brit. Mosses, v.* 1. *n.* 13. *Drummond, Musc. Scot. v.* 1. *n.* 13. *Arn. Disp. Musc. p.* 11.

Hedwigia ciliata. *Hedw. St. Cr. v.* 1, *t.* 40.

Schistidium ciliatum. *Brid. Meth. p.* 21. *Nees et Hornsch. Bryol. v.* 1. *p.* 101. *t.* 8. *f.* 5.

Gymnostomum ciliatum. *Swartz, Musc. Suec. p.* 19. *Smith, Fl. Brit. p.* 1168. *Engl. Bot. t.* 1179.

Bryum ciliatum. *Dicks.*

Bryum apocarpum. β. *Linn. Sp. Pl. p.* 1579.—*Dill. Hist. Musc. t.* 32. *f.* 5.

HAB, Rocks in subalpine countries.

Covering the stones and rocks in mountainous places in great abundance with large patches, which from the diaphanous points to the leaves have a very hoary effect, especially in dry weather.

2. *A. imberbe;* leaves ovato-acuminate the points coloured, those of the perichætium serrated at the extremity. (TAB. VI.)

Gymnostomum imberbe. *Engl. Bot. t.* 2237.

Schistidium imberbe. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 99. *t.* 8. *f.* 4.

Hedwigia integrifolia. *Pal. de Beauv. Prodr. p.* 60.

Anictangium ciliatum. γ. *rufescens. Arn. Disp. Musc. p.* 11.

HAB. Irish mountains. *Miss Hutchins.*

We expressed our opinion in the first edition of the present work that this plant would not prove permanently distinct from the preceding species. *Mr. Arnott* seems to be of the same opinion, since he has made it his var. γ. of *Anict. ciliatum.*

We possess the same species, or variety, which we have received from several parts of North America.

VI. SCHISTOSTEGA.

GEN. CHAR. *Fruitstalk* terminal; mouth of the *Capsule*

naked; lid at length dividing into teeth-like processes? *Calyptra* campanulate. (Tab. I.)

We have never been so fortunate as to gather fresh specimens of this curious genus; and it is only upon the plants preserved in the Herbaria of our friends and of ourselves, that we have been able to make our observations. The result of these has been by no means satisfactory in enabling us to verify those of Hedwig and Mohr, relative to the splitting of the lid into segments. Our drawing of *this character* is consequently taken from Hedwig, and we have adopted the genus, relying wholly on Hedwig's character combined with its peculiar habit, which at first sight approached near to that of the distichous-leaved *Dicrana;* and it is not improbable, that, mistaken for some of the small varieties of *Dicranum bryoides*, it may have escaped the notice of many Botanists in Britain.

We regret to be obliged to say that we have nothing important to add to the result of our own investigations of this genus, since the publication of the above remarks in our first edition of this work. We have, indeed, examined many perfect specimens; we have carefully removed a *lid* from fully formed capsules, and we have seen that this is plane, and formed of a distinctly cellular texture; the *cellules* radiating from the centre towards the circumference, where they always become gradually larger; but we have not been so fortunate, even in capsules that have appeared to be perfectly mature, as to see any splitting of the *operculum*, or any division into laciniæ.

The Rev. Mr. Tozer, who has recently found this plant in considerable plenty in Devonshire, has communicated the following results of his observations to Dr. Greville:—"The *operculum* I examined, was irregularly circular, having two fissures at the opposite extremities, and this being allowed to remain under the microscope for a few hours, it separated into two parts. I endeavoured with a needle, of which the point was curved, to bring the fragments within the field of view; but, on being touched, they split into many segments from the circumference to the centre."

From these remarks it would appear that the operculum of *Schistostega*, (though probably not in a state of nature) splits at different points of the circumference, the laciniæ cohering at the

centre, or apex, which is the last point of their attachment; whereas, Hedwig asserts, "*non integrum, sed de summitate in lacinias irregulares, illico vere revolventes, decidit.*"

The able authors of the *Tentamen Methodi Muscorum* have entered much at large into the history of this Moss, and have given some excellent figures of different portions, especially of the *Calyptra*, which we have copied and added to our representation of the characters of the genus, TAB. I. We have farther added a delineation of the oldest state of the *operculum* we have been able to find. Dr. Greville and Mr. Arnott, in the work just mentioned, have hinted at the near affinity of *Drepanophyllum* of Richard with *Schistostega*, and the latter author in his recently published *Disposition Méthodique des Mousses*, has, though not without a mark of doubt, placed it in the same genus., To this arrangement we are not disposed to assent. We do not know enough of the fruit of *Drepanophyllum* to say that in all essential points *that* is similar, and allowing that the direction of the leaves and their insertion on two opposite sides of the stem be the same, yet the form and texture of this foliage are wholly different, and we are disposed to conceive, that, if natural habits be taken into account, *Drepanophyllum* is as much *sui generis* as *Schistostega*.

Schkuhr and *Bridel* deny the circumstance of the splitting of the *operculum*. *Nees* and *Hornschuch*, on the other hand, describe themselves to have seen the radiating lines, which we have above alluded to, (figured, however, much too plainly at *t.* 9. *f.* 1. of their *Bryologia Germanica*,) and they think to have counted 16 such rays. Left to itself, they say, that even in the Herbarium, this membrane, *(operculum)* readily separates according to the direction of the rays, into many teeth-like processes, which very soon, on account of their extreme delicacy, break away at the *extremities;* so that, in older specimens, nothing is seen but the remains of the *operculum* in the inner margin of the mouth of the capsule.*

* His words are "an einem einzigen Exemplar, welches wir der Güte unseres Freundes von Martius verdanken, sahen wir dieses Deckelchen noch ganz vollständig, und glaubten 16 Streifen auf denselben zu zählen. Sich selbst überlassen, löst sich aber diese Membran (selbst im Herbarium) nach der Richtung der Streifen bald in mehrere zahnförmige Fortsätze auf, welche sich

These observations appear to have been made upon a single specimen; and even here there is nothing like the revolution of the segments described by *Hedwig* and *Mohr*. Indeed, *Nees* and *Hornschuch* doubt if this laciniating membrane be really the *operculum*, and if it be not rather a membrane beneath the *operculum*, analagous to that of *Hymenostomum*. Certain it is, that what we have seen and described is the real *operculum*, and when it is separated from the capsule naturally, or by art, nothing remains at the margin of the mouth.

From all, now, that we can collect upon this subject, it appears to us that the *operculum* of *Schistostega* being thin and membranous, and having the cellules of which it is composed arranged in straight lines, and probably in a single series, radiating from the centre to the circumference, it has a great tendency in age, and when approaching a state of decay, to split in the direction of those rays; but that such a division ought not to be compared with that of the teeth of a true peristome.

We believe the *Schistostega* is found in no country except England and Germany.

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1. *S. pennata*, (Tab. VIII.)

Schistostega pennata. *Musc. Brid. ed.* 1. *Funck, Deutschl. Moose, t.* 6. *n.* 1. *Arn. Disp. Musc. p.* 11.

S. osmundacea. *Mohr, Fl. Crypt. Germ. p.* 92. *Nees et Hornsch. Bryol. Germ. v.* 1. *p.* 108. *t.* 11. *f.* 1.

Gymnostomum pennatum. *Hedw. St. Cr. v.* 1. *t.* 29. *Schwaegr. Suppl. v.* 1. *p.* 19. *Brid. Meth. p.* 16.

G. osmundaceum. *Smith, Fl. Brit. p.* 1161. *Engl. Bot. t.* 2213.

Mnium osmundaceum. *Dicks. Pl. Crypt. Fasc.* 1. *t.* 1. *f.* 4.

Hab. First discovered in Britain by *Mr. Newberry*, in the road from Zele to South Tawton Church, near Okehampton, Devonshire; and, in the same county, by the *Rev. J. S. Tozer*, on the Kingsbridge road, soon after quitting the old road from Totness to Plymouth;—near the village of Haberton about two and a half miles from

aber eben so schnell, ihrer Zartheit wegen, von oben nach unten ganz verlieren, so dass man gewöhnlich bey älteren Exemplaren nur noch Reste derselben am innern Rande die Mündung erblicken kann.

Totness; near Chelwill in the same parish; also, near Meavy Parsonage; always growing upon the hollow mouldering parts of high hedge banks.

The *stems* grow in a loosely tufted manner, and are scarcely half an inch in height, and in all the specimens that we have seen, simple, on the lower half bare of foliage, the upper bearing *leaves* of a lanceolate figure, nerveless, much reticulated, and springing from two opposite sides of the stem in a pinnated manner. These are decurrent at the base, but, by no means confluent, the upper and lower ones the smallest, so that the outline of the frond is lanceolate. The fructification is terminal, the fruitstalk about equal in length to the stem. The *Capsule* spherical, and, as well as the *operculum*, pale brown.

Whilst this very sheet was in the press, we have received, from an unknown friend, the *Nottingham Journal* for April 1, 1826, in which we find the following station given for this exceedingly rare moss. "The *Schistostega pennata* is now abundantly in fructification in Nottingham Forest, where it grows on the roofs of the sandstone caverns, just beyond the Jews burying ground, on the west side of the Gallows Hill." This notice is contained in a very interesting memoir, entitled the *Botanical Calendar for Nottinghamshire*, which bears the signature of *H. Rosafo.*

Div. IV. PERISTOMI.

(MOUTH OF THE CAPSULE FURNISHED WITH A PERISTOME.)

APLOPERISTOMI (PERISTOME SINGLE.)

VII. DIPHYSCIUM.

Gen. Char. *Fruitstalk* terminal; *Capsule* gibbous, *Peristome* single, forming a plicate membranous truncated cone; *Calyptra* mitriform. (Tab. I.)

We are quite unable to detect any thing like a second peristome in this genus, and therefore not unwillingly follow Weber and

Mohr in separating it from *Buxbaumia*, under which it had so long been arranged; and thence follows the necessity of placing it in a different part of the artificial arrangement.

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1. *D. foliosum.* (Tab. VIII.)

Diphyscium foliosum. *Mohr, Obs. Bot. p.* 34. *Hook. in Fl. Lond. new series, (cum Ic.). Moug. et Nestl. n.* 11. *Funck, Deutschl. Moose, t.* 24. *f.* 1. *Hook. Fl. Scot. P. II. p.* 123. *Hobson, Brit. Mosses, v.* 1. *n.* 14. *Drummond, Musc. Scot. v.* 1. *n.* 6. *Arn. Disp. Musc. p.* 12. *Brid. Meth. p.* 123.

Buxbaumia foliosa. *Linn. Syst. Veg. p.* 945. *Hedw. Sp. Musc. p.* 166. *Smith, Fl. Brit. p.* 1148. *Engl. Bot. t.* 329.

Buxbaumia sessilis. *Schmid. Diss. de Buxb. p.* 26. *t.* 1. *f.* 1—24. —*Dill. Musc. t.* 32. *f.* 13.

Hab. Woods, on Banks, and Wall tops in alpine situations.

The plant grows in excessively dense, matted patches, closely interwoven together by means of their numerous fibrous roots. The *leaves* are small, ligulate, of a dark green colour, opaque, furnished with a strong nerve. The *perichætial leaves* are large, erect, membranous, pale brown, covering entirely the capsule, lanceolato-oblong, acuminated, and towards the extremity, cut, in a singular manner, into long slender segments at the margin; *nerve* strong, rigid, brown, very excurrent, serrulate at the extremity. *Capsule* nearly sessile, large, ovate, gibbous, oblique. *Calyptra* mitriform. *Lid* conical, acuminated. *Peristome* simple, consisting of a whitish plicate membrane forming a truncated cone.

VIII. TETRAPHIS.

Gen. Char. *Fruitstalk* terminal; *Péristome* single, consisting of four equidistant upright *teeth*; *Calyptra* mitriform. (Tab. I.)

A genus confined to a very small number of species; of a rigid habit; the lid of the *capsule* is remarkably thin and membranaceous,

(even more so than in *Schistostega*), and the teeth of the peristome are reticulated, not striated as those of other Mosses. The *Calyptra* is striated or furrowed.

Our *Tetraphis Browniana*, together with two nearly allied species, have lately been separated from the genus by Dr. Schwaegrichen under the name of *Tetrodontium*, with the following character:—"*Peristomum* simplex: dentibus quatuor triangularibus. *Flores* dioeci, gemmiformes. *Calyptra* plicata."

1. *T. pellucida*; stems elongated, leaves ovato-acuminate, those of the perichætium lanceolate, capsule cylindrical. (Tab. VIII.)

Tetraphis pellucida. *Hedw. Sp. Musc. t. 7. f. 1. Engl. Bot. t. 1020. Smith, Fl. Brit. p. 1179. Schwaegr. Suppl. v. 1. p. 39. Brid. Meth. p. 26. Hook. Fl. Scot. P. II. p. 124. Mouy. et Nestl. n. 14. Hobson, Brit. Mosses, v. 1. p. 8. Arn. Disp. Musc. p. 14. Hook. in Fl. Lond. cum Ic. (new series).*

Tetraphis cylindrica. *Funck, Deutschl. Moose, t. 6. n. 3.*

Mnium pellucidum. *Linn.—Dill. Musc. t. 31. f. 2.*

Hab. Generally found on decaying trunks of trees; sometimes on the ground.

This plant has a peculiar character which distinguishes it from every known moss. The *leaves* are of a pale and pleasant green colour, rigid, furnished with a nerve which terminates below the point; those surrounding the perichætium are much longer and narrower than the rest. *Capsule* oblong, cylindrical; *teeth* large, very conspicuous, brown; *calyptra* much resembling that of an *Orthotrichum*, but glabrous. Besides the plants which bear the male and female fructification, (usually so called), there are others which are terminated by cup-shaped receptacles, consisting of broadly obcordate leaves, in the centre of which are fixed, by a short footstalk, small spherical bodies, bearing an exact analogy to the *anthers* of *Jungermanniæ*.

2. *T. Browniana*; stems very short, leaves few linear slightly incrassated upwards, those of the perichætium ovate obtuse, capsule ovate. (Tab. VIII.)

Tetraphis Browniana. *Grev. Fl. Edin. p. 230. Drummond, Musc. Scot. v. 2. n. 13. Grev. Scot. Cr. Fl. t. 169. Arn. Disp. Musc. p. 14.*

Tetrodontium Brownianum. *Schwaegr. Suppl. v. 2. t. 129.*

bordered by 16 distinct, but *not equidistant*, teeth, for they approach each other in pairs.

The lid, as Wahlenberg justly observes, is short and obtuse, in which respect *Splachnum* differs from the *Tayloria* of Hooker, as published in the Third Number of the Journal of Science and the Arts, and Musci Exotici, (*Hookeria*, of Schwaegrichen,) as well as in the number and curious configuration of the teeth of the latter.

The annual species of *Splachnum* are usually seen growing on the dung of animals, while the perennial ones are found upon more permanent situations. We have ourselves found *Spl. angustatum* growing vigorously upon an old stocking on Ingleborough, Yorkshire; the same species was seen upon the hat of an unfortunate traveller who had perished on Mount St. Bernard; and Capt. Parry discovered, during his second Arctic voyage, *Splachnum Mnioides* growing in the cavity of the nose on the skull of a musk ox.

* *Leaves acuminate.*

1. *S. sphæricum;* leaves obovato-rotundate acuminate slightly serrated, apophysis ovato-globose wider than the capsule. (Tab. IX.)

Splachnum sphæricum. *Linn. Fil. Meth. Musc. t.* 1. *f.* 1. *Hedw. St. Cr. v.* 2. *t.* 16. *Schwaegr. Suppl. v.* 1. *p.* 54. *Brid. Meth. p.* 107. *Smith, Fl. Brit. p.* 1174. *Hook. Fl. Scot. P. II. p.* 124. *Engl. Bot. t.* 785. *Hobs. Brit. Mosses, v.* 1. *n.* 10. *Drummond, Musc. Scot. v.* 2. *n.* 14. *Arn. Disp. Musc. p.* 12.

S. gracile. *Dicks. Pl. Crypt. Fasc.* 4. *t.* 10. *f.* 5. *Smith, Fl. Brit. p.* 1174. *Schwaegr. Suppl. v.* 1. *p.* 52. *t.* 15. *Funck, Deutschl. Moose, t.* 7. *n.* 9. *Brid. Meth. p.* 107.

S. ovatum. *Hedw. Sp. Musc. p.* 54. *t.* 8. *f.* 4—6. *Turn. Musc. Hib. p.* 15. *Schwaegr. Suppl. v.* 1. *p.* 54. *Smith, Fl. Brit. p.* 1172. *Engl. Bot. t.* 1590. *Brid. Meth. p.* 106.

S. rugosum. *Dicks. Pl. Cr. Fasc.* 4. *t.* 10. *f.* 7.

Hab. On the dung of animals, in alpine countries very abundant.

This is the most common species of the genus, and liable to considerable variation in the length of its stems, which are from a quarter of an inch to an inch in height, and of the fruit-

stalks which are often flexuose. In addition to *S. gracile* which Mr. Turner, and following him, Dr. Mohr, have already justly united to *S. sphæricum*, we have to add, as the former author suspected, on the examination of specimens sent from Mr. Dickson, his own *S. rugosum*. The plants, indeed, figured in English Botany under this name, have the appearance of *S. vasculosum*, but the leaves are acuminate, which is not the case in our *S. vasculosum*. Schwaegrichen, who contends that *S. gracile* is specifically distinct from *sphæricum*, does so principally on the ground that the leaves of the one are serrated and those of the other entire, a rule which does not hold good, as far as our experience will enable us to decide; and we equally think his other characters are not to be relied on; as, for instance, what he introduces into the specific character respecting the green hue of the apophysis of *S. sphæricum*, a circumstance which is observable in every young individual of the genus, and which changes as they advance in age, when that of *S. sphæricum* becomes dark brown, with a yellow capsule.

2. *S. tenue;* leaves obovato-acuminate serrated, apophysis obconical narrower than the capsule, columella exserted. (TAB. IX.)

Splachnum tenue. *Dicks. Crypt. Fasc.* 2. *t.* 4. *f.* 2. *Smith, Fl. Brit. p.* 1171. *Engl. Bot. t.* 1133. *Hobson, Brit. Mosses, v.* 2. *n.* 11. *Hook. Fl. Scot. P. II. p.* 124. *Drummond, Musc. Scot. v.* 2. *n.* 15. *Arn. Disp. Musc. p.* 12.

S. serratum. *Hedw. Sp. Musc. t.* 8. *f.* 1—3. *Schwaegr. Suppl. v.* 1. *p.* 49. *Funck, Deutschl. Moose, t.* 7. *n.* 5. *Brid. Meth. p.* 106.

S. longicollum. *Dicks. Crypt. Fasc.* 4. *t.* 10?*

S. flagellare. *Brid. Meth. p.* 106.

S. helveticum. *Schleich. Cat.*

Grimmia splachnoides. *Smith, Fl. Brit. p.* 1197. *(not E. Bot.)*

HAB. Scotch mountains, upon the ground, in very elevated situations; on turfy soil. On Ben Lawers, most abundant.

* Mr. Brown has remarked to us that this species has never been found in Britain; the specimens in the Banksian Herbarium having been brought from the North West coast of America by Sir Joseph Banks, and Mr. Menzies. Mr. Arnott, nevertheless, doubts if it should not be considered as a variety of *S. tenue.*

The description of *Grimmia splachnoides* in Flora Britannica is taken from specimens which we have examined of this plant; it is consequently very different from *Weissia splachnoides* of *Swartz.* The *stems* are from half an inch to an inch long; the *fruitstalks* from one to two inches in length.

3. *S. mnioides;* leaves ovato-lanceolate much acuminated concave entire, apophysis obovate nearly as narrow as the capsule. (Tab. IX.)

α. minus, of a deeper colour and with shorter stems.

Splachnum mnioides. *Linn. Fil. Meth. Musc. p.* 6. *Hedw. St. Cr. v.* 2. *t.* 11. *Schwaegr. Suppl. v.* 1. *p.* 48. *Brid. Meth. p.* 104. *Funck, Deutschl. Moose, t.* 7. *n.* 2. *Smith, Fl. Brit. p.* 1169. *Engl. Bot. t.* 1539. *Hobson, Brit. Mosses, v.* 1. *n.* 11. *Drummond, Musc. Scot. v.* 1. *n.* 14. *Hook. Fl. Scot. P. II. p.* 124. *Arn. Disp. Musc. p.* 13.

S. urceolatum. *Dicks. Crypt. Fasc.* 2. *p.* 2. *(according to authentic specimens as well as the figure in Engl. Bot. t.* 2417; *not of Hedw.). Smith, Fl. Brit. p.* 1170.

S. urceolatum. *β. Wahl. Fl. Lapp.*

β. majus, of a paler colour, and with elongated stems.

S. fastigiatum. *Dicks. Crypt. Fasc.* 3. *p.* 2. *Smith, Fl. Brit. p.* 1171. *Engl. Bot. t.* 786.

S. purpureum. *Withering.*

S. Brewerianum. *Hedw. St. Cr. v.* 2. *t.* 38. *Schwaegr. Suppl. v.* 1. *p.* 49. *Brid. Meth. p.* 106.—*Dill. Musc. t.* 44. *f.* 5.

Hab. Upon the high grounds in the mountainous parts of England, Scotland, and Ireland, generally growing among mosses in rocky situations; *Mr. Griffiths,* alone, in Withering, mentions his *S. purpureum,* (decidedly our *mnioides*), on cowdung; but his specimens in Mr. Turner's Herbarium, being intermixed with *Hypnum cupressiforme,* seem to render it probable that such could not have been its place of growth.

Besides the characters allotted to the above varieties we can discover no point of distinction between them. The true *S. urceolatum* of Hedwig, (if indeed it be really a distinct species from the present, with which Wahlenberg unites it,) has remarkably concave and obtuse leaves, upon which the hair-like point is suddenly set on; and has not yet been found in Britain.

S. purpureum of Withering, according to Mr. Griffiths' specimens, belongs to this species, and not to *S. tenue* as Sir

James Smith supposes it does. Our *var.* α. rarely exceeds an inch in height; β. attains the length of four or even five inches, is very beautiful, and has the fruitstalks, which are short in proportion to the length of the stems, of a bright and shining orange colour.

4. *S. angustatum;* leaves ovato-lanceolate much acuminated serrated, apophysis obovate somewhat narrower than the capsule, fruitstalks longer than the leaves. (TAB. IX.)

Splachnum angustatum. *Linn. Fil. Meth. Musc. p.* 33. *Hedw. St. Cr. v.* 2. *t.* 22. *Smith, Fl. Brit. p.* 1169. *Engl. Bot. t.* 1132. *Funck, Deutschl. Moose, t.* 7. *n.* 3. *Hook. Fl. Scot. p.* 124. *Schwaegr. Suppl. v.* 1. *p.* 48. *Brid. Meth. p.* 106. *Arn. Disp. Musc. p.* 13.

S. setaceum. *Brid. Musc. p.* 106.

HAB. On cow-dung, and dead and half decayed animal substances. By Loch Awen.—*Mr. Dickson.* Scotch mountains.—*Mr. Mackay.* Cairngorum, and on the mountains of Braemar, on the ground in a turfy soil. On Ingleborough, Yorkshire.

This, which approaches the preceding so nearly in the shape of the leaves, has them, however, serrated, and the points so long as to exceed the fruitstalks, which gives the plant a very peculiar and somewhat Phascum-like appearance. The *stems* vary from half an inch to two or three inches in length.

5. *S. ampullaceum;* leaves ovato-lanceolate acuminate serrated, apophysis inversely flagon-shaped, twice as wide as the capsule. (TAB. IX.)

Splachnum ampullaceum. *Linn. Sp. Pl. p.* 1572. *Hedw. St. Cr. v.* 2. *t.* 14. *Turn. Musc. Hib. p.* 16. *Schwaegr. Suppl. v.* 1. *p.* 52. *Smith, Fl. Brit. p.* 1175. *Funck, Deutschl. Moose, t.* 7. *n.* 8. *Hook. Fl. Scot. P. II. p.* 125. *Hobson, Brit. Mosses, v.* 1. *n.* 11. *Arn. Disp. Musc. p.* 12. *Brid. Meth. p.* 108. *Engl. Bot. t.* 144. *Moug. et Nestl. n.* 15.

S. Turnerianum. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 11. *Smith, Fl. Brit. p.* 1166. *Engl. Bot. t.* 1116. *Brid. Meth. p.* 108.

HAB. Bogs in various parts of England and Ireland. Rare in Scotland; growing upon the ground as well as upon the dung of animals, and on the plains as well as on the mountains.

We agree entirely with Mr. Turner in considering that Mr.

Dickson's *S. Turneriarum* is a variety depending upon age and particular circumstances of season and accident. The whole plant is smaller, and the *apophysis* of the capsule narrower than in the common appearance. In both, the stems are short, often scarcely any, the fruitstalks two and even three inches in length. The *Apodanthus* of M. de la Pylaie is a genus constituted of the capsule of this Moss which had fallen to the ground, as we have ascertained by an examination of authentic specimens.

* * *Leaves obtuse.*

6. *S. vasculosum*; leaves rhombo-rotundate obtuse, the nerve disappearing below the point, apophysis globose much wider than the capsule. (Suppl. Tab. I.)

Splachnum vasculosum. *Hedw. St. Cr. v.* 2. *t.* 15. *Schwaegr. Suppl. v.* 1. *p.* 51. *Grev. Fl. Crypt. Scot. t.* 179. *Arn. Disp. Musc. p.* 12. *Brid. Meth. p.* 107. *Hook. Fl. Scot. P. II. p.* 125.

S. rugosum. *Smith, Fl. Brit. p.* 1173.? *(not Engl. Bot.?) Arn. Disp. Musc. p.* 12. *Brid. Meth. p.* 107.?

Hab. Discovered by *Mr. Don* in Scotland.—In great abundance in boggy places at the sources of springs at an elevation of about 3000 feet above the level of the sea; on Ben More in Glen Dochart, and bearing fructification in great profusion; and in similar situations in equal altitudes on most of the Breadalbane mountains.—In Clova, *Mr. Drummond*, but never bearing capsules.

This is perhaps the finest and most beautiful of all the British Mosses. We have seen it covering a spot of ground many feet in diameter with its brilliant green foliage, and spotted with its large, deep rich brown, shining capsules. The similarity of its foliage to that of *Bryum punctatum* may, perhaps, cause it to be passed by, when barren, as that plant; for the leaves are equally large and glossy and reticulated.—The *stems* are often from three to five inches in length, giving out a disagreeable and fetid smell when fresh. The nerve of the leaf always disappears before the point. The seta or fruitstalk short and succulent; and very fragile in the act of being dried.

Dr. Greville mentions, in his *Cryptogamic Scottish Flora*, having found upon Ben Lawers a *Splachnum* resembling *vascu-*

losum, except in having acute leaves, and which he considers to be a distinct species, and the same as the *S. rugosum* of *Engl. Bot.* This we have never seen, but we fear it will prove but a variety of *S. vasculosum*.

Wahlenberg, indeed, says, what our own observations will by no means confirm, that he has seen some states of *S. vasculosum*, with the apophysis of the capsule so dilated, and the leaves so lengthened out, that they could with difficulty be distinguished from *S. ampullaceum*.

7. *S. Frœlichianum*; leaves ovate rounded at the points, their nerve disappearing below the summit, apophysis obovate much narrower than the capsule. (TAB. IX.)

Splachnum Frœlichianum. *Hedw. St. Cr. v.* 3. *t.* 40. *Schwaegr. Suppl. v.* 1. *p.* 51. *Funck, Deutschl. Moose, t.* 7. *n.* 6. *Hobson, Brit. Mosses, v.* 2. *n.* 12. *(Exotic specimens). Brid. Meth. p.* 105. *(excl. the syn. of Gymn. Griffithianum). Hook. Fl. Scot. P. II. p.* 125.

S. reticulatum. *Smith, Fl. Brit. p.* 1177. *Engl. Bot. t.* 2507. *(not good).*

Dissodon Frœlichianus. *Grev. and Arn. Tent. Meth. Musc. Mem. III. p.* 122. *Arn. Disp. Musc. p.* 13.

Bryum reticulatum. *Dicks. Crypt. Fasc. t.* 4. *f.* 6.

HAB. On Ben High, in Aberdeenshire. *Mr. Dickson.*

We know not that any Botanist has found this Moss in Britain except Mr. Dickson; and it may well be reckoned among the rarest of the tribe with us. Upon the Swiss Alps it is far from uncommon.

In habit this plant is certainly very nearly allied to *Splachnum scabrisetum, (Hook. in Musci Exotici, t.* 32.*) Systylium splachnoides* of *Hornschuch*, and *Weissia splachnoides*, and hence Dr. Greville and Mr. Arnott have been led to unite them in the genus *Dissodon*.

In *S. Frœlichianum* the capsule is of a pale brown colour, the stems scarcely ever more than half an inch in length, and the fruitstalks about twice as long.

X. CONOSTOMUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 16

equidistant teeth, all united at their summit; *Calyptra* dimidiate. (TAB. I.)

This curious genus, which was first established by Swartz in Schrader's Journal, approaches in habit, as Wahlenberg justly observes, to *Bartramia fontana*, and the exotic species, named *C. australe*, has actually been described by Bridel under the name of *Bartramia pentasticha*.

1. *C. boreale;* stems elongated, leaves lanceolate acuminate carinate slightly toothed. (TAB. X.)

Conostomum boreale. *Swartz in Schrad. Bot. v.* 1. *p.* 24. *t.* 5. *Schwaegr. Suppl. v.* 1. *p.* 79. *t.* 21. *Brid. Meth. p.* 27. *Hobson, Brit. Mosses, v.* 2. *n.* 12. *Drummond, Musc. Scot. v.* 1. *n.* 71. *Hook. Fl. Scot. P. II. p.* 125. *Arn. Disp. Musc. p.* 40.

Grimmia Conostoma. *Smith, Fl. Brit. p.* 1196. *Engl. Bot. t.* 1135.

Bryum tetragonum. *Dicks. Crypt. Fasc.* 2. *p.* 8. *t.* 4. *f.* 9.

HAB. Summits of the Scotch mountains, not unfrequent.

This is altogether an alpine plant, rarely, perhaps, in our country, found at a lower degree of elevation than 3000 feet above the level of the sea. In Switzerland its place of growth is at a height of 7 or 8000 feet upon the mountains. Upon Goat-fell, in Arran, we have gathered this plant four or five inches in length, but always barren.

The leaves do not appear to us, by any means, to give the stems a regularly tetragonous appearance, as Mr. Dickson's name implies, nor to be quinquefarious, according to Sir James Smith's remarks. Sometimes, in dried specimens, the imbrication of the carinated leaves makes the stems seem angular; but when moist, that appearance vanishes, and they are nearly cylindrical. The capsules, and indeed the whole plant, bear no very slight resemblance to small specimens of *Bartramia fontana;* the *operculum*, however, is conico-subulate.

XI. POLYTRICHUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 32 or 64, equidistant, incurved teeth; their summits united

by a horizontal membrane; *Calyptra* dimidiate, small. (Tab. I.)

The teeth in this genus are short, incurved, obtuse, between membranaceous and cartilaginous, their margins whitish, semipellucid, their centres marked with a red longitudinal line; and the horizontal membrane which unites them appearing perforated, (probably owing to its cellular texture) under a high power of the microscope.

The following extract from Wahlenberg will justify us in rejecting the division of this tribe into *Polytrichum* and *Catharinea*, as adopted by Ehrhart and Mohr. "In hoc et plerisque Polytrichis pili calyptræ tum in apice ipsius calyptræ tum in vaginula inseruntur. Flos fœmineus calyptræ summitatem et vaginulam continuas habet, utrasque filis succosis erectis cohærentibus vestitas. Post florescentiam in altum surgit summitas calyptræ, et inferior pars elongatur simulque glabra fit, dum pili vaginulæ cum calyptræ pilis cohærentes elongantur demumque ab insertione evellentur. Hinc quasi deorsum reflexi apparent pili; quod tamen neutiquam sunt, dum antea inferne in vaginula inserti fuerunt. De cætero pilositas calyptræ in diversis diversa: in *P. hercynico* per totam calyptram sparsa, apud *P. undulatum* in apice tantum, et apud *P. lævigatum* omnino deest."

* *Calyptra naked.*—(Catharinea *Ehrh.*).

1. *P. undulatum*; leaves lanceolate undulate, the margins plane denticulated, their nerve winged, capsule cylindrical curved, lid subulate. (Tab. X.)

Polytrichum undulatum. *Hedw. St. Cr. v.* 1. *t.* 16, 17. *Turn. Musc. Hib. p.* 91. *Smith, Fl. Brit. p.* 1382. *Engl. Bot. t.* 1220. *Schwaegr. Suppl. v.* 1. *p.* 330. *Funck, Deutschl. Moose, t.* 57. *n.* 18. *Hobson, Brit. Mosses, v.* 1. *n.* 13. *Drummond, Musc. Scot. v.* 2. *n.* 20. *Hook. Fl. Scot. P. II. p.* 125. *Arn Disp. Musc. p.* 72.

Polytrichum angustatum. *Funck, Deutschl. Moose, t.* 57. *n.* 19.

Catharinea Callibryon. *Ehrh. Crypt.* 83.

Catharinea undulata. *Web. et Mohr.—Moug. et Nestl. n.* 131.

Atrichum undulatum. *P. de Beauv.*

Bryum undulatum. *Linn.—Dill. Musc. t.* 46. *f.* 18.

Hab. Common on moist shady banks, and in woods.

Stems from one to two inches high, leaves of a thin and delicate structure, (unlike those of the rest of the genus), crisped when dry. A very remarkable variety of this plant has been found by Mr. Templeton in the Dargle near Dublin, with fruitstalks scarcely two lines in length, and the back of the leaf furnished with evident denticulations, which latter circumstance is not confined to this variety, and has been observed by Bridel. The winged nerve we do not remember to have seen previously noticed,—it is a narrow foliaceous appendage running along each side of the nerve. Something of this kind may indeed be remarked on the nerves of all the *Polytricha*, (as may be seen by our figures), that is to say, they are furnished, in a more or less degree, with lamellæ, which in *P. lævigatum* of Wahlenberg are so prominent as almost to resemble the leaves of a book; in the following species, *P. hercynicum*, they are less evident, and in most of the larger species give the nerve a striated appearance.

2. *P. hercynicum;* leaves lanceolate rigid entire their sides involute, their nerve broad impressed with furrows, capsule oblong suberect, lid conical. (Tab. X.)

Polytrichum hercynicum. *Hedw. St. Cr. v.* 1. *t.* 15. *Smith, Fl. Brit. p.* 1381. *Engl. Bot. t.* 1209. *Schwaegr. Suppl. v.* 1. *p.* 329. *Funck, Deutschl. Moose, t.* 57. *n.* 17. *Drummond, Musc. Scot. v.* 2. *n.* 21. *Hook. Fl. Scot. P. II. p.* 125. *Arn. Disp. Musc. p.* 72.

Catharinea hercynica. *Ehrh.—Moug. et Nestl. n.* 725.

Orthotrichum hercynicum. *Hoffm.*

Atrichum hercynicum. *P. de Beauv.*

Hab. On mountains at a considerable elevation.

Stems short. Leaves, as it were, intermediate in texture between those of *P. undulatum* and the rest of the *Polytricha*.

* * *Calyptra covered with succulent filaments.*

† *Leaves entire; their margins involute.*

3. *P. piliferum;* leaves lanceolato-subulate their margins involute entire terminating in a pellucid hair-like point, capsule ovate obtusely quadrangular furnished with an apophysis, lid conical. (Tab. X.)

Polytrichum piliferum. *Schreb. Fl. Lips. p.* 74. *Menzies in Linn.*

Trans.—Turn. Musc. Hib. p. 82. *Smith, Fl. Brit. p.* 1375. *Engl. Bot. t.* 1199. *Schwaegr. Suppl. v.* 1. *p.* 313. *Moug. et Nestl. n.* 128. *Funck, Deutschl. Moose, t.* 54. B. *f.* 5. *Hobson, Brit. Mosses, v.* 1. *n.* 14. *Drummond, Musc. Scot. v.* 2. *n.* 17. *Hook. Fl. Scot. P. II. p.* 125. *Arn. Disp. Musc. p.* 71.

P. commune. *γ. Linn.—Dill. Musc. t.* 54. *f.* 3.

HAB. On heaths.

Stems short, destitute of leaves at the base.

4. *P. juniperinum;* leaves lanceolato-subulate their margins involute entire, their points acuminated coloured subserrated, capsule ovate obtusely quadrangular furnished with an apophysis, lid conical. (TAB. X.)

Polytrichum juniperinum. *Willd. Fl. Berol.—Hedw. Sp. Musc. t.* 18. *Turn. Musc. Hib. p.* 82. *Smith, Fl. Brit. p.* 1375. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 4. *Engl. Bot. t.* 1200. *Funck, Deutschl. Moose, t.* 54. B. *f.* 1. *Hobson, Brit. Mosses, v.* 1. *n.* 15. *Drummond, Musc. Scot. v.* 1. *n.* 17. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 70. *Schwaegr. Suppl. v.* 1. *p.* 309. *Brid. Meth. p.* 194.

P. juniperifolium. *Hoffm.—Moug. et Nestl. n.* 417.

P. strictum. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 1. *Turn. Musc. Hib. p.* 83. *Engl. Bot. t.* 2435.

P. alpestre. *Hoppe.—Schwaegr. Suppl. v.* 1. *p.* 310. *t.* 97. *Funck, Deutschl. Moose, t.* 54. B. *n.* 2.

P. affine. *Funck, Deutschl. Moose, t.* 54. B. *n.* 3.

P. scabriusculum. *Brid. Meth. p.* 195.

P. commune. *β. Linn.—Dill. Musc. t.* 54. *f.* 3.

HAB. On heaths.

We can perceive no other difference between the *P. strictum* and *P. juniperinum* than that the former is branched, while the stems of the latter are undivided, and we therefore cordially assent to the opinion of Mr. Turner, who considers them as the same species. Following Mohr also, we have united to our plant the *P. alpestre* of Hoppe and Schwaegrichen. We must here also declare, that, except in the want of the hair-points to the leaves, and their being more scabrous at the extremity, we can find no essential difference between this and the preceding species, *P. piliferum.*

5. *P. septentrionale;* leaves lineari-subulate obtuse their margins especially towards the top involute subserrulate, capsule ovate subangulate furnished with a minute apophysis, lid conical acuminate. (TAB. X.)

Polytrichum septentrionale. *Swartz, Musc. Suec. t.* 9. *f.* 18. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 5. *Schwaegr. Suppl. v.* 1. *p.* 313. *Hobson, Brit. Mosses, v.* 2. *n.* 14. *(fruit foreign). Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 71.

P. sexangulare. *Hoppe.—Engl. Bot. t.* 1906. *Funck, Deutschl. Moose, t.* 54. B. *n.* 4. *Brid. Meth. p.* 196.

P. norvegicum. *Hedw. Sp. Musc. t.* 22.

P. crassisetum. *De Cand. Fl. Fr.*

P. helveticum. *Schleich. Cat.*

HAB. Highest summit of Ben Nevis, Scotland.—In fruit on Brae Reach, and Ben-y-Mac Duich, the highest of the Cairngorum range of Grampian mountains. *Messrs. Greville, Arnott, and Hooker*, 1822.

This species has been found in Britain only upon the highest summits of the above mentioned mountains, and was discovered first, in 1808, upon Ben Nevis by Messrs. Turner and Hooker, where, though occurring in tolerable plenty, it did not produce a single capsule. In the autumn of 1822, its fructification was first found, as mentioned above. On the loftiest summits of the Swiss Alps, *P. septentrionale* is far from uncommon, and fructifies whilst covered with snow, where scarcely any perfect plant can vegetate. It is a species remarkable in the form of its leaves, which are very obtuse, curled when dry, so convex behind as to be semicylindrical, having their margins, especially at the tops, involute, and there alone slightly serrated. The *fruitstalks* too, are of a succulent, by no means rigid, texture, and much thickened; whence the expressive name appropriated to it by De Candolle, and which we should have gladly adopted, were not priority claimed by that of *P. septentrionale*. We are surprised that Mohr should say of *P. sexangulare* "optimi juris species, facile dignoscenda," since it precisely agrees with specimens of the present plant that we have received from Swartz himself. We must, however, declare, that neither the figures of Swartz nor of Menzies give a correct idea of its leaves.

†† *Leaves serrated, their margins plane.*

6. *P. commune;* stems elongated, leaves patent lineari-subulate their margins plane serrated as well as the points of the

keels, capsule ovate quadrangular with an evident apophysis. (Tab. X.)

α. *yuccæfolium*; stems a span and more in height; leaves with their margins of the same colour; capsule acutely quadrangular, its apophysis very distinct.

Polytrichum commune. *Linn. Sp. Pl. p.* 1573. *Hedw. Sp. Musc.* —*Menzies in Linn. Trans. Turn. Musc. Hib. p.* 80. *Smith, Fl. Brit. p.* 1372. *Engl. Bot. t.* 1197. *Schwaegr. Suppl. v.* 1. *p.* 314. *Funck, Deutschl. Moose, t.* 55. *f.* 7. *Hobson, Brit. Mosses, v.* 1. *n.* 16. *Drummond, Musc. Scot. v.* 2. *n.* 16. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 71.

P. remotifolium. *Schwaegr. Suppl. v.* 1. *p.* 320. (together with *P. purpurascens*, and *P. subpilosum* of the same author, according to *Mr. Arnott.*)

P. Commersonianum. *Brid. Meth. p.* 198.

P. yuccæfolium. *Ehrh. Mohr, Moug. et Nestl. n.* 415.

P. perigoniale. *Funck, Deutschl. Moose, t.* 55. *f.* 8.—*Dill. Musc. t.* 54. *f.* 1.

β. *attenuatum*; stems three or four inches in height; leaves shorter, their margins pellucid; capsule obtusely quadrangular; apophysis indistinct.

P. attenuatum. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 2. *Turn. Musc. Hib. p.* 84. *Smith, Fl. Brit. p.* 1373. *Engl. Bot. t.* 1198.

P. formosum. *Hedw. Sp. Musc. t.* 19. *f.* 1. *Schwaegr. Suppl. v.* 1. *p.* 315. *Mohr.*—*Wahl.*—*Moug. et Nestl. n.* 416. *Funck, Deutschl. Moose, t.* 55. *f.* 9.

P. gracile. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 3. *Turn. Musc. Hib. p.* 85. *Engl. Bot. t.* 1827. *Mohr.*

P. longisetum. *Swartz, Musc. Suec. t.* 8. *f.* 16. *Funck, Deutschl. Moose, t.* 56. *f.* 11.

P. aurantiacum. *Hoppe.*—*Wahl.*

P. pallidisetum. *Funck, Deutschl. Moose, t.* 56. *f.* 10.

Hab. Heaths, in wet and dry places, varying much in height according to situation.

After an attentive examination of the above synonyms and specimens, received, in most instances, from their respective authors, we cannot but consider them all to belong to the same species; and, indeed, that, as varieties, we think only two are worthy of particular attention. In all, the stems are simple, or only branched very low down, and among the roots. Our var. α. is found from a span to a foot in height, with the leaves very patent, often recurved, long and narrow, their margins scarcely at all diaphanous; the capsule is sharply quadrangular, the apophysis

very distinct. In β. the stems do not often exceed three or four inches; the leaves are rather less patent than in α. and of a shorter and broader figure, with their margins whitish and diaphanous; the capsule is obsoletely quadrangular, and the apophysis indistinct. In both, the leaves are equally decidedly serrated.

With regard to the *P. gracile*, Mr. Menzies was inclined at first to consider it only a variety of *P. attenuatum*, and we must confess that we can ourselves see no difference whatever. Of this latter, which Mohr takes up from Hedwig under the name of *formosum*, he says, in his German Cryptogamic Flora, "obsoleta et adnata nec distante apophysi a præcedente (*P. communi*), statim dignoscenda et bona omnino species," although his only character by which it may be distinguished from *formosum*, is, that the capsule is obsoletely sexangular, a peculiarity which we cannot find to exist in any of our specimens. Wahlenberg, on the other hand, seems to be of opinion, that it is only a slender variety of *P. attenuatum*; and he founds the chief distinction of the latter from *P. commune* in the diaphanous margins to the leaves.

7. *P. alpinum*; stems elongated branched, leaves patent subulato-lanceolate their margins plane serrated as well as the points of the keels, capsule subovate with an indistinct apophysis. (Tab. XI.)

Polytrichum alpinum. *Linn. Sp. Pl. p.* 1593. *Menzies in Linn. Trans. Hedw. Sp. Musc. t.* 19. *Turn. Musc. Hib. p.* 85. *Smith, Fl. Brit. p.* 1377. *Engl. Bot. t.* 1905. *Moug. et Nestl. n.* 209. *Funck, Deutschl. Moose, t.* 57. *f.* 12. *Schwaegr. Suppl. v.* 1. *p.* 317. *Brid. Meth. p.* 198. *Hobson, Brit. Mosses, v.* 1. *n.* 17. *Drummond, Musc. Scot. v.* 1. *n.* 16. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 71.

P. sylvaticum. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 6.

P. arcticum. *Swartz, Musc. Suec. t.* 8. *f.* 17.

P. ambiguum. *Michaux.*

P. ferrugineum. *Brid. Suppl.*

Hab. In subalpine regions, in England, Scotland, and Ireland.

The narrow leaves will distinguish this species from *P. urnigerum*, as the branched and somewhat fastigiate stems will from

P. commune and its varieties. The stems are from three to four inches in height, the capsule is exceedingly variable in form. In *English Botany* it is represented as quadrangular, but far more decidedly so than ever we have seen it; not unfrequently it is ovate without any angles; we have some specimens, gathered on the highest summit of Ben Nevis, in which it is almost exactly spherical; and Wahlenberg has met with plants having capsules so cylindrical that he mistook them for individuals of *P. urnigerum*. The apophysis is very indistinct, sometimes obsolete. Mr. Arnott thinks that the *P. campanulatum* and *furcatum* of *Hornschuch*, in *Hor. Phys. Ber.*, are hardly to be distinguished from this.

8. *P. urnigerum;* stems elongated branched, leaves erecto-patent lanceolate acute their margins plane serrated, capsule erect cylindrical destitute of an apophysis. (TAB. XI.)

Polytrichum urnigerum. *Menzies in Linn. Trans. Turn. Musc. Hib. p.* 86. *Smith, Fl. Brit. p.* 1377. *Engl. Bot. t.* 1218. *Schwaegr. Suppl. v.* 1. *p.* 318. *Hobson, Brit. Mosses, v.* 1. *n.* 18. *Drummond, Musc. Scot. v.* 1. *n.* 15. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 71. *Moug. et Nestl. n.* 28. *Funck, Deutschl. Moose, t.* 57. *f.* 14.

P. pulverulentum. *Schwaegr. Suppl. v.* 1. *p.* 322. *Brid. Meth. p.* 199.

P. fasciculatum. *Brid. Meth. p.* 199.

P. dentatum. *Schwaegr. Suppl. v.* 1. *p.* 321. *Brid. Meth. p.* 199.

P. nigrescens? *Brid. Meth. p.* 198.

P. microstomum? *Brown in Linn. Trans. v.* 12. *p.* 569.

HAB. On banks and sides of streams, principally in mountainous countries. Mr. Turner has found it on banks at Gillingham, Norfolk.

This species has much resemblance to the following in the shape of the capsule, but in its foliage approaches nearer to the two preceding ones. The leaves, however, are very much more acute, broader, very strongly toothed, and of a singularly glaucous green hue, (reddish only through age,) by which it may be distinguished at first sight. Its stems are still more branched than those of *P. alpinum*, and about two or even three inches in length.

9. *P. aloides;* stems short, leaves linear-lanceolate obtuse, their margins plane serrated principally at the extremity and at

the summit of the keels, capsule nearly erect cylindrical without an apophysis. (TAB. XI.)

α. *major*; fruitstalks two inches long; stems usually simple.

Polytrichum aloides. *Hedw. St. Cr. v.* 1. *t.* 14. *Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 88. *Smith, Fl. Brit. p.* 1380. *Engl. Bot. t.* 1619. *Schwaegr. Suppl. v.* 1. *p.* 322. *Hobson, Brit. Mosses, v.* 1. *n.* 18. *Drummond, Musc. Scot. v.* 2. *n.* 19. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 71. *Moug. et Nestl. p.* 129. *Funck, Deutschl. Moose, t.* 56. *f.* 15.

P. defluens. *Brid. Meth. p.* 200.

P. rubellum. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 3. *Turn. Musc. Hib. p.* 87. *Smith, Fl. Brit. p.* 1381. *Engl. Bot. t.* 1939.

Mnium polytrichoides. β. *Linn. Sp. Pl. p.* 1577.—*Dill. Musc. p.* 55. *f.* 7.

β. *Dicksoni*; fruitstalks very short; stems branched with innovations.

P. Dicksoni. *Turn. Musc. Hib. p.* 90. *t.* 10. *f.* 2. *Engl. Bot. t.* 1605. *Brid. Meth. p.* 201.

HAB. Moist banks, not uncommon.

Stems, for the most part, half an inch high and simple; in the *P. rubellum* of Menzies sometimes an inch in length, and producing here and there innovations which make them appear branched. The *var.* β. has the stems always branched with one or more annotinous shoots, each of which generally bearing a fruitstalk not more than half an inch long, gives the plant a very remarkable appearance, which has induced that admirable muscologist, Mr. Turner, to consider it a distinct species.

10. *P. nanum*; stems short, leaves linear-lanceolate obtuse their margins serrated principally at the extremity, as well as the summit of the keels, capsule nearly erect subglobose. (TAB. XI.)

Polytrichum nanum. *Hedw. St. Cr. v.* 1. *t.* 13. *Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 89. *Smith, Fl. Brit. p.* 1379. *Engl. Bot. t.* 1625. *Schwaegr. Suppl. v.* 1. *p.* 324. *Hobson, Brit. Mosses, v.* 1. *n.* 20. *Drummond, Musc. Scot. v.* 2. *n.* 20. *Hook. Fl. Scot. P. II. p.* 126. *Arn. Disp. Musc. p.* 72. *Moug. et Nestl. n.* 130. *Funck, Deutschl. Moose, t.* 56. *f.* 16.

P. semidiaphanum. *Brid. Meth. p.* 200.

P. intermedium. *Brid. Meth. p.* 200.

P. subrotundum. *Menzies in Linn. Trans. Smith, Fl. Brit. p.* 1378. *Engl. Bot. t.* 1624.

P. pumilum. *Swartz, Musc. Suec. t.* 9. *f.* 19. *Hedw. Sp. Musc. t.* 21.—*Dill. Musc. t.* 55. *f.* 6.

HAB. Moist banks, frequently with *P. aloides*, common.

We are quite unable to find any difference between the *P. nanum* and *subrotundum* of authors; and with regard to the species itself, we have seen capsules in so exactly an intermediate state between it and *P. aloides*, that we have been at a loss to determine to which they should be referred, and we avow our readiness to subscribe to an opinion that they may be considered mere varieties of the same species.

XII. CINCLIDOTUS.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 32 filiform, twisted teeth, anastomosing at their base; *Calyptra* mitriform. (TAB. I.)

The *calyptræ* of all the specimens that we have examined are so far split on one side as to leave some doubt as to the propriety of calling them mitriform, which we do in deference to preceding Botanists. We cannot hesitate, however, to confess, that in the present instance we have but little reliance on the character taken from the calyptra, which, among other tribes of mosses, we have found to be of the greatest importance. The fruit we believe to be terminal, although, in the majority of instances, situated on branches so short as scarcely to leave room for more than perichætial leaves. The general appearance of the single known individual of this genus is that of a *Trichostomum*, whilst its peristome approaches nearer to that of *Tortula*.

1. *C. fontinaloides.* (TAB. XI.)

Cinclidotus fontinaloides. *Beauv. Prodr. d'Œtheog. p.* 28. *et* 52. *Hobson, Brit. Mosses, v.* 2. *n.* 15. *Drummond, Musc. Scot. v.* 1. *n.* 50. *Hook. in Fl. Lond. ed.* 2. *(with a figure.) Moug. et Nestl. n.* 510. *Funck, Deutschl. Moose, t.* 16. *f.* 1. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 23.

Trichostomum fontinaloides. *Hedw. St. Cr. v.* 3. *p.* 36. *t.* 14. *Turn. Musc. Hib. p.* 41. *Schwaegr. Suppl. v.* 1. *p.* 160. *Smith, Fl. Brit. p.* 1248.

Fontinalis minor. *Linn. Sp. Pl. p.* 1571. *Engl. Bot. t.* 557.

Fontinalis alpina. *Dicks. Crypt. Fasc.* 2. *t.* 4. *f.* 1.
Racomitrium fontinaloides. *Brid. Meth. p.* 80.—*Dill. Musc. t.* 33. *f.* 2.

HAB. Growing on stones and wood, in streams of water.

Plant from four to six inches long, branches of a dark lurid green colour. Leaves imbricating the stem on every side, elliptico-lanceolate, acuminated, margined, entire, flexuose, curled when dry, nerve strong. Perichætial leaves nearly as long as the fruit, much acuminated. *Fruitstalks* shorter than the capsule. *Capsules* oblong, smooth, brown; lid conico-acuminate. *Peristome* bright red, rigid, arising from the reticulated membrane; *teeth* numerous, capillary, slightly twisted, below anastomosing.

XIII. TORTULA.

GEN. CHAR. *Fruitstalk* terminal; *Peristome* single, of 32 spirally twisted teeth, united more or less at the base into a tubular membrane; *Calyptra* dimidiate. (TAB. II.)

Not only in the *Syntrichiæ* of *Bridel* and *Mohr*, but in several other species of the present genus, is the membrane which unites the teeth at the base sufficiently visible; as, for example, in *T. muralis*, *T. tortuosa*, and *T. unguiculata*, likewise in the exotic *T. serrulata*, and *T. Australasiæ*; so that we cannot avoid reuniting the *Syntrichiæ* with the older genus *Tortula*.

We follow, in the arrangement of the species, that which Dr. Hooker and Dr. Greville have adopted in their Memoir on the genus *Tortula*, published in the First Volume of *Brewster's Journal of Science*, *p.* 287.

A. *Leaves rigid, nerveless.*

1. *T. enervis;* stem very short, leaves few lingulate very obtuse concave nerveless rigid, the margins involute, lid conico-acuminate rather shorter than the oblong capsule. (SUPPL. TAB. II.)

Tortula enervis. *Hook. et Grev. l. c. p.* 288. *Arn. Disp. Musc. p.* 37.

T. rigida. *Smith, Fl. Brit. p.* 1249.? *Engl. Bot. t.* 180. *Schwaegr. Suppl. v.* 1. *p.* 118. *Brid. Meth. p.* 88.

Barbula rigida. *Hedw. Sp. Cr. v.* 1. *p.* 65. *t.* 25. *Moug. et Nestl. n.* 614. *Schultz in Nov. Act. Cæs. v.* 11. *p.* 196. *t.* 32.

Bryum stellatum. *Schreb. Fl. Lips. p.* 80.?

HAB. Walls and clay banks. Near Yarmouth.

2. *T. brevirostris;* stem very short, leaves few rotundato-elliptical very obtuse concave nerveless rigid, the margins involute, lid conical scarcely beaked half the length of the oblong capsule. (SUPPL. TAB. II.)

Tortula brevirostris. *Hook. et Grev. l. c. p.* 289. *t.* 11. *Arn. Disp. Musc. p.* 37. *Hook. Fl. Scot. ed.* 2. *diss.*

T. rigida. *Funck, Deutschl. Moose, p.* 15.

HAB. On an old wall near Edinburgh. *D. Stewart, Esq.*

We find this *Tortula* alluded to by Turner and Smith, under their descriptions of *T. rigida*, as having a short operculum. Besides this character in the operculum as distinguishing it from *T. enervis*, the leaves are invariably shorter and broader than in that species, and the peristome is only half the length. The different form of the leaves of these two species, and their being destitute of nerve, essentially characterize them, as distinct from the true *T. rigida*, with which so many authors have confounded them.

B. *Leaves rigid, nerved.*

3. *T. rigida;* stem very short, leaves few linear incurved submucronulate grooved nerved rigid, the margins involute, lid rostrate about half the length of the oblong capsule. (TAB. XII.)

Tortula rigida. *Turn. Musc. Hib. p.* 43. *Hook. et Grev. l. c. p.* 289. *Arn. Disp. Musc. p.* 37. *Hobson, Brit. Mosses, v.* 1. *n.* 21.

Trichostomum aloides. *Koch, in litt. (fide Moug. et Nestl.) Moug. et Nestl. n.* 717.

Bryum rigidum. *Huds. Angl. p.* 477.—*Dill. Musc. t.* 49. *f.* 55.

HAB. Near Yarmouth, and at Henfield in England. Upon clay banks.

The peristome of this Moss is shorter than that of most

species of the genus *Tortula*, which has led some Botanists to refer it to *Trichostomum*; but the fringe is decidedly twisted, both in our specimens and those of Mougeot and Nestler; and Schultz, not being acquainted with our *T. rigida*, has considered us, in the first edition of this work, to have fallen into an error in describing the leaves as nerved.

C. *Leaves thin, nerved.*

Leaves. 1. *Those of the perichætium convolute.*

4. *T. convoluta*; stem rather short, leaves oblongo-lanceolate acute their margins plane those of the perichætium remarkably convolute, capsule oblong, lid rostrate. (Tab. XII.)

Tortula convoluta. *Swartz, Musc. Suec.—Smith, Fl. Brit. p.* 1253. *Engl. Bot. t.* 2382. *Turn. Musc. Hib. p.* 149. *Hobson, Brit. Mosses, v.* 2. *n.* 19. *Drummond, Musc. Scot. v.* 1. *n.* 23. *Hook. Fl. Scot. P. II. p.* 128. *Arn. Disp. Musc. p.* 37.

Barbula convoluta. *Hedw. St. Cr. v.* 1. *p.* 87. *t.* 32. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 214. *t.* 213. *Moug. et Nestl. n.* 716. *Funck, Deutschl. Moose, t.* 15. *f.* 6. *Schwaegr. Suppl. v.* 1. *p.* 127. *Brid. Meth. p.* 94.

Bryum convolutum. *Dicks.*

Bryum setaceum. *Huds.—Dill. Musc. t.* 48. *f.* 44.

Hab. Banks and tops of turf walls, not uncommon in the subalpine parts of the kingdom.

The perichætial leaves of this plant are strikingly convolute; the hue is yellowish; the fruitstalks pale like those of *Didymodon pallidum*.

5. *T. revoluta*; stem short, leaves lanceolate acute their margins remarkably revolute those of the perichætium sheathing involute, capsule oblong, lid rostrate shorter than the capsule.

Tortula revoluta. *Brid. in Schrader's Journ. an.* 1800. *v.* 1. *p.* 299. *Drummond, Musc. Scot. v.* 2. *n.* 22. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 37.

T. nervosa. *Smith, in Engl. Bot. t.* 2383.

Barbula revoluta. *Mohr.—Schwaegr. Suppl. v.* 1. *p.* 127. *t.* 32. *Brid. Meth. p.* 95. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 215. *t.* 33. *f.* 23. *Funck, Deutschl. Moose, t.* 15. *n.* 7.

B. convoluta. *Moug. et Nestl. n.* 218.

B. obtusifolia. *Schwaegr. Suppl. v.* 1. *t.* 31. *Schultz, in Nov. Act.*

Acad. Cæs. v. 11. *p.* 206. *t.* 32. *f.* 13.? *Funck, Deutschl. Moose, t.* 15. *f.* 8.

B. Hornschuchiana. *Schultz, l. c. p.* 217. *t.* 33. *f.* 25.

HAB. Banks and sandy plains.

In the *Barbula obtusifolia* of *Schwaegrichen*, above quoted, the leaves are a little broader than in the common appearance of the plant, and somewhat more obtuse at the extremity. Schultz's plant under the same name, may, perhaps, be different, and, as the author himself observes, is more like *Barbula unguiculata*, its foliage being altogether destitute of the remarkably revolute margins.

B. Hornschuchiana has the perichætial leaves sheathing at the base, and thence lengthened out into a subulate point, but it is not otherwise different from our *T. revoluta*.

2. *Leaves uniform.*

* *piliferous.*

6. *T. muralis;* stem very short, leaves patent narrow oblong the margins recurved the nerve strong running out into a hoary point, capsule oblongo-cylindrical, lid conical acuminate. (TAB. XII.)

α. *leaves with a long white hair-like point, and carinated.*

Tortula muralis. *Hedw. Sp. Musc. p.* 123. *Swartz, Musc. Suec.—Turn. Musc. Hib. p.* 50. *Smith, Fl. Brit. p.* 1257. *Engl. Bot. t.* 2033. *Hook, Fl. Scot. P. II. p.* 127. *Hobson, Brit. Mosses, v.* 2. *n.* 16. *Drummond, Musc. Scot. v.* 2. *n.* 24. *Arn. Disp. Musc. p.* 37.

Barbula muralis. *Mohr.—Moug. et Nestl. n.* 127. *Schwaegr. Suppl. v.* 1. *p.* 132. *Brid. Meth. p.* 61. *Funck, Deutschl. Moose, t.* 15. *n.* 11. *Schultz, in Nov. Act. Acad. Cæs.* . 11. *p.* 221. *t.* 34. *f.* 29. A. B.

B. hercynica. *Brid. Meth. p.* ''

B. pilifera. *Brid. Meth. p.* 59.

B. Vahliana. *Schultz, l. c. p.* 222. *t.* 34. *f.* 31.

Bryum murale. *Linn. Sp. Pl. p.* 1581.—*Dill. Musc. t.* 45. *f.* 14.

β. *leaves nearly plane, scarcely piliferous.*

Barbula æstiva. *Web. et Mohr, Fl. Crypt. Germ. p.* 207. *Schultz, l. c. p.* 223. *t.* 34. *f.* 32.

B. cuneifolia. *Funck, Deutschl. Moose, t.* 15. *f.* 12.

B. mutica. *Brid. Meth. p.* 91.

HAB. Walls and stones; abundant.

The *Barbula Vahliana* seems to accord well with this species,

and with regard to the *B. æstiva*, Sir James Smith has well observed, in the *Flora Britannica*, that it is only a variety of our plant, with shortly aristated, scarcely piliferous, leaves.

We have observed an *annulus* in this species.

7. *T. ruralis;* stem elongated, leaves ovato-oblong keeled patent recurved the nerve ending in a long point, capsule cylindrical erect slightly curved, lid subulate, the peristome tubular as far as the middle. (TAB. XII.)

α. vulgaris; leaves rather acute, the hair-like point generally scabrous.

Tortula ruralis. *Swartz, Musc. Suec.—Turn. Musc. Hib. p.* 50. *Smith, Fl. Brit. p.* 1254. *Engl. Bot. p.* 2070. *Schwaegr. Suppl. v.* 1. *p.* 137. *t.* 34. *Funck, Deutschl. Moose, t.* 16. *n.* 3. *Hobson, Brit. Mosses, v.* 1. *n.* 22. *Drummond, Musc. Scot. v.* 2. *n.* 18. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 38.

Syntrichia ruralis. *Brid. Meth. p.* 98. *Brown, in Parry's First Voyage, App. p.* cxcviii. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 229. *t.* 34. *f.* 3.

S. norvegica. *Web. et Mohr, in Arch. Nat. t.* 5. *f.* 1.

Barbula ruralis. *Hedw. Sp. Musc. p.* 121. *Moug. et Nestl. n.* 26.

Bryum rurale. *Linn. Sp. Pl.—Dill. Musc. t.* 45. *f.* 12.

HAB. Roofs of houses, especially such as are thatched with straw; on walls and on the ground, rarely on trees.

The *var. β.* has not, that we are aware, been found in Britain. It is thus characterized by Greville and Hooker, in their Memoir on the genus, "*foliis obtusioribus medium versus contractis, pilo plerumque lævi;*" and is the *Syntrichia lævipila* of *Bridel* and *Schwaegrichen.*

The species may be reckoned among the largest of the genus. We found specimens upon Craigalleach, in Breadalbane, which have measured seven or eight inches in length. These, however, are always barren. The leaves vary somewhat in shape.

Our friend, Mr. Lyell, has found a state of this plant, also without fructification, growing on the trunks of trees at Rumsay, Hants, in which the nerves were gemmiferous; the *gemmæ* clothing the upper side of the nerve, near the middle of the leaf, of a roundish or oblong form, green, reticulated. The nerve is by no means so dilated as in the gemmiferous plants of *Gymnostomum ovatum.*

* * *Leaves mucronate.*

† *Peristome tubular beyond the middle.*

8. *T. subulata;* stem very short, leaves erecto-patent oblongo-lanceolate apiculated the margin plane, capsule cylindrical erect slightly curved, lid subulate, peristome tubular almost to the extremity. (Tab. XII.)

α. leaves acuminate.

Tortula subulata. *Hedw. Sp. Musc. p.* 122. *t.* 27. *Turn. Musc. Hib. p.* 44. *Smith, Fl. Brit. p.* 1255. *Engl. Bot. t.* 1101. *Schwaegr. Suppl. v.* 1. *p.* 135. *t.* 38. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 38. *Hobson, Brit. Mosses, v.* 1. *n.* 23. *Drummond, Musc. Scot. v.* 2. *n.* 21. *Funck, Deutschl. Moose, t.* 10. *f.* 1.

Barbula subulata. *Moug. et Nestl. n.* 126.

Syntrichia subulata. *Web. et Mohr, Fasc. p.* 214. *Brid. Meth. p.* 97. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 227. *t.* 34. *f.* 1. A. B.

Bryum subulatum. *Linn. Sp. Pl. p.* 1581.—*Dill. Musc. t.* 45. *f.* 10.

β. Leaves oblong, obtuse (with a mucro).

Hab. On the ground in all parts of Britain. *β.* New Forest, Hampshire. *C. Lyell, Esq.*

This possesses by far the largest leaves of any British species, although the stems are extremely short and unbranched;—but they are sometimes furnished with innovations. The leaves are, moreover, succulent, pellucid in their lower half, curled when dry. The nerve is more or less protruded beyond the acuminated extremity of the leaf, but we have never seen it diaphanous. The *capsules* are long, cylindrical, sometimes, especially when old, curved; the lid long, subulate; the *peristome* also long, forming a bright red tube; the *teeth*, or *ciliæ*, free only at the end, when they form a twisted sort of brush. In habit, as well as in place of growth, it has much affinity with *T. cuneifolia*.

† † *Teeth of the peristome almost entirely free.*

9. *T. unguiculata;* stem elongated branched, leaves oblongo-lanceolate subcarinated obtuse apiculated the margin slightly recurved, capsule oblongo-ovate, lid long rostrate. (Tab. XII.)

Tortula unguiculata. *ed.* 1. *p.* 33. *Hook. Fl. Scot. p.* 128. *Hobson, Brit. Mosses, v.* 1. *n.* 24. *Drummond, Musc. Scot. v.* 2. *n.* 25. *Arn. Disp. Musc. p.* 38.

Barbula unguiculata. *Hedw. St. Cr. v.* 1. *t.* 23. *(good). Moug. et Nestl. n.* 27. *Funck, Deutschl. Moose, t.* 15. *n.* 2. *Schwaegr. Suppl. v.* 1. *p.* 123. *Brid. Meth. p.* 94.—*Dill. Musc. t.* 48. *f.* 48, 49.

B. acuminata. *Hedw. Sp. Musc. p.* 117. *t.* 25. *f.* 5—7. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 202. *t.* 32. *f.* 9. *Schwaegr. Suppl. v.* 1. *p.* 123.

Tortula mucronulata. *Swartz, Musc. Suec. p.* 40. *Turn. Musc. Hib. p.* 47. *Smith, Fl. Brit. p.* 1250. *Engl. Bot. t.* 1299.

T. aristata. *Smith, Fl. Brit. p.* 1261. *Engl. Bot. t.* 2393.

T. barbata. *Smith, Fl. Brit. p.* 1260. *Engl. Bot. t.* 2391.

T. humilis. *Turn. Musc. Hib. p.* 45. *Engl. Bot. t.* 1663. (not *Barbula humilis* of *Hedw.* and *Schwaegr.*).

Barbula apiculata. *Hedw. Sp. Musc. p.* 117. *t.* 26. *f.* 1—4. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 202. *t.* 33. *f.* 17. *Schwaegr. Suppl. v.* 1. *p.* 122. *Brid. Meth. p.* 94.

Tortula apiculata. *Turn. Musc. Hib. p.* 46. *Smith, Engl. Bot. t.* 2494.

T. ericetorum. *Smith, Fl. Brit. p.* 1258. *Engl. Bot. t.* 2495.

Barbula cuspidata. *Schultz, l. c. p.* 206. *t.* 32. *f.* 14. A. *a.* B. *elongata.*

B. fastigiata. *Schultz, l. c. p.* 207. *t.* 33. *f.* 15.

B. microcarpa. *Schultz, l. c. p.* 209. *t.* 33. *f.* 18.

B. lanceolata. *Hedw. Sp. Musc. p.* 119. *t.* 26. *Schultz, l. c. p.* 203. *t.* 32. *f.* 10. *Brid. Meth. p.* 94.

B. stricta. *Hedw. Sp. Musc. p.* 119. *t.* 26. *Schultz, l. c. p.* 203. *t.* 32. *f.* 11. *Schwaegr. Suppl. v.* 1. *p.* 122. *Brid. Meth. p.* 90.

B. amœna, dubia, and aristata. *Brid. Meth.*

HAB. Banks and hedges, very frequent.

We are led to include so great a number of synonyms under the above species from a careful examination of the descriptions and figures, as well as of authentic specimens, whenever we could have recourse to them.

It is a plant which, growing in almost every variety of soil and situation, is subject to alter considerably in its appearance. The form of the leaf, however, we find to be tolerably constant.

10. *T. stellata;* stems very short tufted, leaves oblongo-ovate or ovate rather concave subopaque mucronulate furnished with a strong brown nerve. (TAB. XII.)

Tortula stellata. *Smith, Fl. Brit. p.* 1254. *Engl. Bot. t.* 2384. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 39.

Bryum stellatum. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 6. *(without the synonyms).*

Barbula agraria. *Hedw. St. Cr. v.* 3. *t.* 6. *Schwaegr. Suppl. v.* 1. *p.* 129. *Schultz, in Nov. Act. Cæs. v.* 11. *p.* 199. *t.* 32. *f.* 4. *Brid. Meth. p.* 88.

B. stellata. *Brid. Meth. p.* 88.

B. domestica. *Richard Mss. Brid. Meth. p.* 89. *Schultz, l. c. p.* 200. *t.* 32. *f.* 5.

B. pallens. *Brid. Meth. p.* 88.

HAB. Scotland. *Mr. Dickson.*

This minute plant, which has very much the delicacy of structure and reticulation of the leaves of *T. cuneifolia*, has been found only by Mr. Dickson in Britain, "ad aggeres et rivulorum margines Scotiæ." We have compared some original specimens of Mr. Dickson with the West Indian *Barbula agraria*, sent by the younger Hedwig to Mr. Turner, and we find them to coincide in every particular;—a point indeed already determined by the author of the *Muscologia Hibernica*. This, then, (unless Mr. Dickson should, by some accident, have mistaken a foreign specimen for one gathered in Scotland, which we cannot help suspecting,) appears to be one of the few instances of a plant of the tropics having been found in so northern a region.

11. *T. cuneifolia;* stem scarcely any, leaves very broad obovate slightly concave pellucid the nerve running out into rather a strong mucro, capsule oblong, lid with a short beak, (ciliæ of the peristome united at the very base). (TAB. XII.)

Tortula cuneifolia. *Turn. Musc. Hib. p.* 51. *Smith, Fl. Brit. p.* 1257. *Engl. Bot. t.* 1510. *Arn. Disp. Musc. p.* 39.

Bryum cuneifolium. *Dicks. St. Crypt. Fasc.* 3.

Barbula Dicksoniana. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 224. *t.* 34. *f.* 33.—*Dill. Musc. t.* 45. *f.* 15.

HAB. On banks and in fields; particularly common in Devonshire, especially near Torquay and the hilly country about Tor-point.

Foreign authors appear to have no knowledge of this plant, which is one of the most distinct in the genus.

* * * *Leaves muticous.*

12. *T. tortuosa;* stem elongated branched, leaves patent linear-

subulate keeled waved crisped when dry, capsule cylindrical, lid with a long beak. (Tab. XII.)

Tortula tortuosa. *Hedw. Sp. Musc. p.* 124. *Turn. Musc. Hib. p.* 52. *Hobson, Brit. Mosses, v.* 2. *n.* 17. *Drummond, Musc. Scot. v.* 2. *n.* 19. *Arn. Disp. Musc. p.* 37. *Hook. Fl. Scot. P. II. p.* 127.

Barbula tortuosa. *Schwaegr. Suppl. p.* 129. *t.* 33. *Moug. et Nestl. n.* 314. *Funck, Deutschl. Moose, t.* 15. *n.* 9. *Brid. Meth. p.* 95. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 219. *t.* 34. *f.* 28.

Bryum tortuosum. *Linn.—Dill. Musc. t.* 48. *f.* 40.

Hab. Rocks; especially on a calcareous soil.

This differs from most of the British species of *Tortula* by the great length of the stems, and from all by the undulated margins of its leaves when dry. *Barbula inclinata* of *Schwaegrichen's Suppl.* comes very near to this species; but its stems and leaves are short; these latter being more erect when moist; and by its more curved capsule.

13. *T. fallax;* stem elongated branched, leaves lanceolate acuminated carinated patent or recurved the margins reflexed, capsule oblong, lid with a long beak. (Tab. XII.)

α. stem about an inch high, leaves recurved.

Tortula fallax. *Swartz, Musc. Suec. p.* 40. *Turn. Musc. Hib. p.* 48. *Smith, Fl. Brit. p.* 1252. *Engl. Bot. t.* 1708. *Hobson, Brit. Mosses, v.* 2. *n.* 18. *Drummond, Musc. Scot. v.* 2. *n.* 20. *Hook. Fl. Scot. P. II. p.* 127. *Arn. Disp. Musc. p.* 39.

Barbula fallax. *Hedw. St. Cr. v.* 1. *p.* 24. *Moug. et Nestl. n.* 715. *Funck, Deutschl. Moose, t.* 15. *f.* 5. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 211. *t.* 33. *f.* 21. A. *Schwaegr. Suppl. v.* 1. *p.* 127. *Brid. Meth. p.* 92.

Tortula imberbis. *Smith, Fl. Brit. p.* 1261. *Engl. Bot. t.* 2329.

T. unguiculata. *Turn. Musc. Hib. p.* 47. *Smith, Fl. Brit. p.* 1251. *Engl. Bot. t.* 2316. *(not of Hedw.).—Dill. Musc. t.* 48. *f.* 46, 47.

Barbula flavescens, reflexa, orientalis, atlantica, et Turneri. *Brid. Meth. (fide Arn.).*

β. stem two or three inches high, leaves longer and patent.

Bryum linoides. *Dicks. Crypt. Fasc.* 3. *p.* 8. *t.* 8. *f.* 3.

Barbula linoides. *Brid. Meth. p.* 90. *(not Tortula linoides. Engl. Bot.).*

γ. stem half an inch high, fruitstalks elongated.

Barbula brevicaulis. *Schwaegr. Suppl. v.* 1. *p.* 126. *t.* 32.

Hab. On walls, banks, and in fields among grass.

We know of no plant of this genus that varies so much in the size of the stems as this; so that the dwarfish individuals,

growing in dry fields, would scarcely be believed to be the same as those luxuriant specimens found on the moist banks of rivers. In the former situation, when about half an inch, or somewhat more, in height, it agrees with the *T. unguiculata* of Smith; when an inch and upwards, it becomes *T. fallax*, and when nearly two or three inches, it is the *Bryum linoides* of Dickson. In the leaves, too, there is some difference, being in the last mentioned variety longer and sharper than in the others. The direction of the leaves is usually recurvo-patent. The *T. imberbis* of Smith, agrees with the most usual appearance of *T. fallax*.

We scarcely know to what the *var.* β. and γ. of Schultz properly belong; like our *var.* β. of *T. gracilis*, they appear to be intermediate between *T. gracilis* and *T. fallax*, and all might with propriety come under the latter and older species.

14. *T. gracilis;* stem elongated somewhat branched, leaves lanceolato-acuminate erect rigid when dry very straight the margin recurved, capsule oblongo-ovate, lid rostrate very short. (SUPPL. TAB. II.)

Tortula gracilis. *Hook. and Grev. on Tort. p.* 300. *Arn. Disp. Musc. p.* 39.

Barbula gracilis. *Schwaegr. Suppl. p.* 125. *t.* 34. *Schultz, in Nov. Act. Acad. Cæs. v.* 11. *p.* 198. *t.* 32. *f.* 3.

β. *viridis;* stems and leaves somewhat wider, the latter a little patent.

T. brevifolia. *Smith, Fl. Brit. p.* 1259. *Engl. Bot. t.* 2453.

Barbula brevifolia. *Brid. Meth. p.* 92.

HAB. α. Scotland.—*Mr. Dickson and Mr. Drummond.* β. Durham and Northumberland.—*Mr. Winch.* Near Cork.—*Mr. Drummond.*

Very closely allied to *T. fallax*, but a smaller and slenderer plant; its *leaves* are far more rigid, more erect, and very straight, when dry quite appressed to the stem. *Colour* brownish in α.; green in β., which latter appearance is so like to *T. fallax*, that we have hesitated to which of the two species to refer it.—Mr. Arnott, indeed, has observed to us that the *T. gracilis* is not distinct from *T. fallax;* and, moreover, that it is not uncommon in Scotland.

XIV. ENCALYPTA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 16 teeth; *Calyptra* campanulate, smooth, entirely enclosing the mature *Capsule.* (TAB. II.)

The anomaly least to be expected in this very natural genus is the decided difference that exists in the shape of the teeth of its peristome; for while those of *E. vulgaris*, and *E. ciliata* are short and lanceolate, those of *E. streptocarpa* are filiform, elongated, and, by their close approximation, almost forming a tube. The *columella*, too, in this last plant, is exserted beyond the tops of the *teeth*, which we have never observed in the two other British species.

1. *E. streptocarpa;* stems elongated, leaves elliptico-lanceolate somewhat obtuse their nerve not produced beyond the summits, capsule cylindrical spirally striated, calyptra toothed at the base. (TAB. XIII.)

Encalypta streptocarpa. *Hedw. Sp. Musc. t.* 61. *Turn. Musc. Hib. p.* 18. *Smith, Fl. Brit. p.* 1182. *Engl. Bot. t.* 2163. *Hobson, Brit. Mosses, v.* 2. *n.* 20. *Moug. et Nestl. n.* 506. *Funck, Deutschl. Moose, t.* 8. *n.* 5. *Hook. Fl. Scot. P. II. p.* 128. *Schwaegr. Suppl. v.* 1. *p.* 59. *Brid. Meth. p.* 30. *Arn. Disp. Musc. p.* 23.

Bryum ciliare. *Dicks.—Dill. Musc. t.* 43. *f.* 71.

HAB. Stony mountainous countries; upon mortared walls, especially near water; as upon the parapets of bridges. In the Highlands, frequent; but every where very rare in fructification. The only place where we have ever seen it in that state is on the walls of a bridge in the grounds of his Grace the Duke of Athol, at Dunkeld.

This is by far the largest of the British species of the genus, often exceeding two inches in the length of its *stems*, which are thickly clothed with *leaves*, whose nerve is, on the back, and towards the point, slightly serrated, while the margins are entire as in the other species. The present may be distinguished not only by its size, but by its spirally twisted *capsule*, and above all, by its deep red, very long, capillary teeth. We may add, that the *lid* is spirally striated, in which

circumstance, as well as in the shape and texture of the leaves, it has a strong affinity with *Tortula subulata.*

2. *E. vulgaris;* stems short, leaves oblongo-elliptical obtuse their nerve produced a little beyond the summits, capsule cylindrical smooth, calyptra entire at the base. (TAB. XIII.)

Encalypta vulgaris. *Hedw. Sp. Musc. p.* 60. *Turn. Musc. Hib. p.* 17. *Smith, Fl. Brit. p.* 1180. *Moug. et Nestl. n.* 17. *Hobson, Brit. Mosses, v.* 2. *t.* 21. *Drummond, Musc. Brit. v.* 1. *t.* 22. *Funck, Deutschl. Moose, t.* 8. *n.* 1. *Schwaegr. Suppl. v.* 1. *p.* 56. *Brid. Meth. p.* 28. *Arn. Disp. Musc. p.* 23. *Hook. Fl. Scot. p.* 128.

Leersia vulgaris. *Hedw. St. Cr. v.* 1. *t.* 28.

Bryum extinctorium. *Linn. Sp. Pl.—Engl. Bot. t.* 558.—*Dill. Musc. t.* 45. *f.* 8.

HAB. On banks, walls, and rocks, principally on such as are calcareous.

This has always a *calyptra* which is quite entire at the base; in that respect coming near some of the states of *E. rhaptocarpa;* but from which it may be known by the smooth, (not sulcated,) *capsule,* and by its place of growth, which is never alpine.

It is difficult to examine the peristome of this species from the facility with which it breaks away and is carried off with the lid; both generally coming away with the removal of the calyptra.

3. *E. ciliata;* stems more or less elongated, leaves oblongo-acuminate nerve produced considerably beyond the summit, capsule cylindrical smooth, calyptra with a distinct fringe at the base. (TAB. XIII.)

α. concolor; leaves apiculate, their points of the same colour.

Encalypta ciliata. *Hedw. Sp. Musc. t.* 61. *Turn. Musc. Hib. p.* 18. *Smith, Fl. Brit. p.* 1181. *Engl. Bot. t.* 1418. *Hobson, Brit. Mosses, v.* 2. *n.* 22. *Drummond, Musc. Scot. v.* 1. *n.* 23. *Funck, Deutschl. Moose, t.* 8. *n.* 6. *Moug. et Nestl. n.* 609. *Schwaegr. Suppl. v.* 1. *p.* 59. *Arn. Disp. Musc. p.* 23. *Hook. Fl. Scot. p.* 128.

E. fimbriata. *Brid. Meth. p.* 30.

Leersia ciliata. *Hedw. St. Cr. v.* 1. *t.* 19.

Bryum extinctorium. *β. Linn. Sp. Pl. p.* 1581.—*Dill. Musc. t.* 45. *f.* 9.

β. pilifera; leaves much acuminated, their points diaphanous, (teeth deciduous).

Encalypta alpina. *Engl. Bot. t.* 1419.

E. affinis. *Hedw. fil. in Web. et Mohr, Beitr. t. 4. Schwaegr. Suppl. v. 1. p. 58. t. 16. Brid. Meth. p. 29. Arn. Disp. Musc. p. 23.*

E. pilifera. *Funck, t. 8. n. 2.*

HAB. α. and β. not uncommon in the mountainous parts of England, Scotland, and Ireland, upon rocks, particularly near waterfalls.

In our former edition of this work we were induced to unite the present with the following species. But we have since had the opportunity of seeing the latter, which we then knew but imperfectly, in great abundance upon the mountains, and we are disposed to agree with our friend Dr. Greville in considering it a distinct species, depending for its most essential character upon the distinctly sulcated *capsule*, and the nature of the *ciliæ* of the *calyptra*. In *E. ciliata*, these ciliæ, or teeth, are of a nature as thick as the calyptra itself, and apparently set on to it with a margin, thus not appearing to be a continuation of the calyptra.—In *E. rhaptocarpa* the ciliæ seem rather to be the torn or lacerated margin of the calyptra itself, more thin and membranaceous than the rest of the calyptra, and hence more easily broken off; so that the fringe often appears wanting, and is generally so figured.

4. *E. rhaptocarpa;* stems more or less elongated, leaves oblong apiculate, the points of the same colour, capsule cylindrical sulcated, calyptra ciliated at the margin, ciliæ deciduous. (SUPPL. TAB. II.)

Encalypta rhaptocarpa. *Schwaegr. Suppl. v. 1. p. 56. t. 16. Brid. Meth. p. 29. Arn. Disp. Musc. p. 23. Grev. Scot. Crypt. Fl. t. 163.*

E. ciliata. *γ. rhaptocarpa. Hook. and Taylor, Musc. Brit. ed. 1. p. 36.*

HAB. Ben Bulben in Ireland, *J. T. Mackay, Esq.* On the higher of the Scotch mountains, perhaps not uncommon. On the Breadalbane mountains, near the summits, plentiful.

Dr. Greville has well illustrated this plant in his beautiful Scottish Cryptogamic Flora.

XV. GRIMMIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* of 16 entire

or perforated, rarely cleft, equidistant teeth; *Calyptra* mitriform. (TAB. II.)

This is a genus so closely bordering upon *Trichostomum*, that it is not possible to form either a natural or artificial character that may decidedly distinguish them. We have rather retained it in deference to the opinion of preceding Botanists, than from a thorough conviction of the propriety of so doing. The species all grow in a densely tufted manner, and are of a blackish or brownish hue, mostly with rather short stems. *Grimmia concolor*, however, which has decidedly the teeth peculiar to the genus, bears stems as long as those of many *Trichostoma*. *Grimmia ovata*, and *Grimmia pulvinata*, have sometimes their teeth cleft; the latter indeed generally.

* *Fruit sessile, or nearly so.*

1. *Gr. apocarpa;* stems branched, leaves ovato-lanceolate recurvo-patent, their margins reflexed, the perichætial ones having their nerve disappearing immediately below their summits, capsule ovate sessile, lid shortly rostrate. (TAB. XIII.)

α. nigro-viridis; leaves broader, blackish green.

Grimmia apocarpa. *Hedw. St. Cr. v.* 1. *t.* 39. *Turn. Musc. Hib. p.* 20. *Smith, Fl. Brit. p.* 1200. *Engl. Bot. t.* 1134. *Moug. et Nestl. n.* 17. *Schwaegr. Suppl. v.* 1. *p.* 96. *Brid. Meth. p.* 33. *Drummond, Musc. Scot. v.* 1. *p.* 26. *Hook. Fl. Scot. P. II. p.* 128. *Arn. Disp. Musc. p.* 20. *Funck, Deutschl. Moose, t.* 12. *n.* 20.

Gr. alpicola. *Swartz, Musc. Suec. t.* 1. *Hedw. Sp. Musc. t.* 15. *Smith, Fl. Brit. p.* 1199. *Schwaegr. Suppl. v.* 1. *p.* 95. *Brid. Meth. p.* 33.

Gr. rivularis. *Brid. in Schrad. Journ. v.* 5. *t.* 3. *Turn. Musc. Hib. p.* 21. *t.* 2. *f.* 2. *Schwaegr. Suppl. v.* 1. *t.* 23. *Funck, Deutschl. Moose, t.* 12. *f.* 22. *Smith, Fl. Brit. p.* 1200. *Moug. et Nestl. n.* 508.

Gr. fasciculata. *Brid. Meth. p.* 37.

Gr. gracilis. *Schwaegr. Suppl. v.* 1. *t.* 23. *Brid. Meth. p.* 33. *Moug. et Nestl. n.* 509.

Gr. conferta. *Funck, Deutschl. Moose, t.* 12. *f.* 19.

Gr. apocaula. *Hoffm.—Moug. et Nestl. n.* 18.—*Dill. Musc. t.* 32.

β. stricta; stem elongated, leaves narrower, reddish brown.

Grimmia stricta. *Turn. Musc. Hib. p.* 20. *t.* 2. *f.* 1. *Brid. Meth. p.* 34.

Hedwigia nervosa. *P. de Beauv.*

Schistidium nervosum. *Brid. Meth. p.* 21.

HAB. *α.* on trees and rocks in moist places, as well as in alpine rivulets. *β.* on rocky places in elevated mountains.

We heartily accord with Bridel when he says of this species "*adeo diversiformis et pro sedis conditione ita varians ut verus Proteus sit.*" Upon trees and on humid rocks the stems vary much in length, being from one to two or three inches long, usually every where clothed with leaves; these leaves, moreover, are at their summits not unfrequently terminated by diaphanous points; from these slight differences, added to the more or less branched habit, have arisen the *Grimmia alpicola*, and *apocaula* of authors. When growing on rocks, in mountain streams, its length is still greater, the branches somewhat more fastigiate, the leaves decayed at the base, every where of a darker colour, and never furnished with diaphanous points; hence, the *Gr. rivularis* of authors: whilst on elevated mountains a variety has been found (the *Gr. stricta* of Mr. Turner,) whose slender, often straight and brittle branches, and red brown colour, might at first lead to the suspicion of its being a distinct species; but its leaves differ in no essential particular, and the capsule in all the varieties is liable to no small degree of difference in form, being more or less ovate, but sometimes, especially when the lid has fallen, turbinate. The *Gr. gracilis* of Schwaegrichen we rather refer to our *var. α.* on account of its colour. Wahlenberg has considered the *Gr. stricta*, and *Gr. rivularis* as varieties of his *Gr. alpicola*, and has separated them all from *Gr. apocarpa* on account of their want of the diaphanous points to the leaves.

2. *Gr. maritima;* stems short pulvinate, leaves lanceolate acuminate nearly erect crisped when dry, their margins recurved, those of the perichætium with the nerve running beyond their summits, capsule ovate sessile, lid shortly rostrate. (TAB. XIII.)

Grimmia maritima. *Turn. Musc. Hib. p.* 23. *t.* 5. *f.* 2. *Smith, Fl. Brit. p.* 1195. *Engl. Bot. t.* 1645. *Drummond, Musc. Scot. v.* 1. *p.* 25. *Hook. Fl. Scot. P. II. p.* 129. *Arn. Disp. Musc. p.* 20. *Schwaegr. Suppl. v.* 1. *p.* 95. *t.* 22. *Brid. Meth. p.* 32.

Gr. alpicola β. *Wahl. Fl. Lapp.*

HAB. On rocks by the sea-shore.

Proteus-like as is *Gr. apocarpa*, we cannot agree with Wahlenberg in supposing this to belong to any one of its varieties. It has a short and peculiarly tufted mode of growth, like that of *Gr. pulvinata;* its *leaves* are narrower than those of *Gr. apocarpa*, resembling in shape those of *Gr. ovata;* but they are more erect than either, never hair-pointed, and decidedly crisped when dry. The perichætial leaves, too, afford, we think, additional characters; for they are long, narrow, concealing the fruit, and have a remarkably brown, strong, excurrent nerve. The *peristome* in the last, as in the present species, is sometimes entire; but more frequently irregularly perforated.

** *Fruitstalks longer than the leaves.*

† *Fruitstalks curved, or geniculate.*

3. *Gr. saxicola;* stems scarcely any, leaves linear-subulate crisped when dry, fruitstalks geniculate, capsule ovate, lid rostrate straight. (TAB. XIII.)

Grimmia geniculata. *Schwaegr. Suppl. v.* 1. *p.* 82. *t.* 22. *Arn. Disp. Musc. p.* 19. *Funck, Deutschl. Moose, t.* 11. *n.* 1.
Dicranum Saxicola. *Mohr.*
Weissia geniculata. *Brid. Meth. p.* 38.
Campylopus Saxicola. *Brid. Meth. p.* 72.
Campylopus curvifolius. *Brid. Meth. p.* 78.

HAB. On sandstone rocks in Sussex.—*Mr. Borrer.* On granite rocks in the Dublin mountains.

Mohr does not appear to have seen the calyptra of this species, which is mitriform as in the genus *Grimmia*, multifid at its base, and adhering so closely to the lid as not to be separated without it from the capsule. The *stems* are shorter than in any of the British *Grimmiæ;* and this circumstance, together with the general shape of the leaves, and minute size of the whole plant, renders it difficult to be distinguished at first sight from *Weissia trichodes*, among which Mr. Borrer finds it growing.

It has a still closer affinity with *Weissia recurvata*, especially in the bent fruitstalks; but this last mentioned plant has them curved, not geniculate, with leaves shorter and more setaceous.

4. *Gr. pulvinata;* stems short pulvinate, leaves narrow elliptical their margins recurved, points diaphanous piliform, fruitstalks curved, capsule ovate striated, lid conical acuminate. (TAB. XIII.)

Grimmia pulvinata. *Smith, in Engl. Bot. t.* 1728. *Hook. Fl. Lond. ed.* 2. *(with a figure). Hook. Fl. Scot. P. II. p.* 129. *Hobson, Brit. Mosses, v.* 1. *n.* 26. *Drummond, Musc. Brit. v.* 2. *n.* 26. *Funck, Deutschl. Moose, t.* 12. *f.* 13. *Arn. Disp. Musc. p.* 21.

Trichostomum pulvinatum. *Mohr, Crypt. Germ. p.* 109.

Dicranum pulvinatum. *Swartz.—Turn. Musc. Hib. p.* 78. *Smith, Fl. Brit. p.* 1214. *Schwaegr. Suppl. v.* 1. *p.* 189. *Moug. et Nestl. n.* 124.

Fissidens pulvinatus. *Hedw. Sp. Musc. t.* 40.

Campylopus pulvinatus. *Brid. Meth. p.* 75.

Bryum pulvinatum. *Linn. Sp. Pl. p.* 1586.—*Dill. Musc. t.* 50. *f.* 65.

HAB. On walls and rocks.

Nearly allied to this is the *Trichostomum funale* of Schwaegrichen, which we have in this work ventured to make a variety of *Tr. patens;* but our *Gr. pulvinata* is a much smaller plant, having broader leaves much more suddenly acuminate. The teeth of the peristome are generally perforate or deeply cleft, more rarely entire; hence it has by some writers been put among the *Dicrana,* and by others among the *Trichostoma.* It is quite unnaturally arranged by some authors in the genus *Dicranum.*

5. *Gr. trichophylla;* stems elongated loosely tufted, leaves lax waved lanceolate carinate gradually tapering into a diaphanous point their margins recurved, fruitstalk flexuose and curved, capsule elliptical-ovate sulcate, lid rostrate. (SUPPL. TAB. II.)

Grimmia trichophylla. *Greville, Scot. Cr. Fl. t.* 100. *Drummond, Musc. Scot. v.* 2. *n.* 27. *Arn. Disp. Musc.* p. 21.

Dicranum pulvinatum. *β. Turn. Musc. Hib. p.* 78. *t.* 3. *f.* 1.?

HAB. Discovered in Scotland by Dr. Greville on stone walls; in which situations in many places it has been found to be not uncommon; as upon Arthur's seat, and on the coast of Fife; Ravelrig Toll. Plentiful in the Highlands, especially near Dunkeld and Blair in Athol. —Near Dublin. *Dr. Scott,* and *Dr. Stokes.*

Along with the teeth of a *Grimmia,* (slightly perforated

only or split at the very extremity,) this plant has the leaves very much resembling those of *Trichost. patens*, especially our *var.* β. It often grows with *Gr. pulvinata*, large specimens of which it much resembles; but the leaves are much narrower, and the capsule is more deeply sulcate.

Mr. Turner's *var.* β. of *Dicr. pulvinatum* appears to be the same as our plant, but of a smaller size.

6. *Gr. spiralis;* stems elongate pulvinate, leaves lanceolate tapering into a diaphanous hair-like point, erect when moist, spirally twisted when dry, fruitstalks curved, capsule ovate smooth. (SUPPL. TAB. II.)

Grimmia spiralis. *Hook. and Taylor, in Drummond, Musc. Scot. v. 2. n. 29. Greville, Scot. Cr. Fl. t. 203. Arn. Disp. Musc. p. 21.*

HAB. Rocks. East side of Slemish mountain, County of Antrim, Ireland. Rocks on Ben Lawers abundantly, where it is not unfrequent in fruit. Found on many of the Grampians by *Mr. Arnott* and *Dr. Greville*, and is probably not uncommon. Clova, *Mr. Drummond*, but not in fruit.

Since the publication of the first edition of this work, we have determined two additional species of *Grimmia* which are remarkable for their leaves, when dry, being spirally twisted round the stem. The one we have named *Gr. spiralis;* for the other we have adopted the MSS. name of *Dr. Hornschuch*, who some time ago sent us a specimen of the same plant, but who appears, like ourselves, to find it only in a barren state; *Grimmia spiralis* differs from *Gr. torquata* in its more rigid habit, much longer diaphanous points to the leaves, which are, moreover, not so decidedly torquate, and are of a blacker colour. From *Gr. ovata* our plant may be known by its curved fruitstalks, and from *Gr. pulvinata* by its lanceolate, gradually tapering *leaves*, smooth *capsule*, and from both by its twisted leaves; *Grimmia fusco lutea* of *Hook. Musci Exotici*, a native of South America, has the leaves longer and narrower, and always straight; otherwise it could scarcely be distinguished from *Gr. spiralis.*

In the teeth of the peristome of our plant, we perceive a dark central line, and Dr. Greville finds them to be bifid or

trifid at the extremity. A specimen, every way according with our plant, has been sent to us by Dr. Hornschuch from the Saltzburgian Alps, under the name of *Gr. incurva* of Dr. Schwaegrichen; but the true *Gr. incurva* of Dr. Schwaegrichen has the leaves singularly patent, much narrower, with far shorter hair-like points.

Mr. Arnott considers that this plant may be the same as *Gr. apiculata* of Schwaegrichen, but the whole plant in this latter species is shorter, yet stouter, its leaves are scarcely piliferous or twisted, and the teeth, Dr. Greville says, are perforated, not cleft.

7. *Gr. torquata;* stems elongated exceedingly densely pulvinate of a very soft texture, leaves lanceolate acuminate the upper ones scarcely piliferous, all of them remarkably spirally twisted when dry. (SUPPL. TAB. II.)

Grimmia torquata. *Hornsch. in litt.—Hook. in Drummond, Musc. Scot. v.* 2. *n.* 28. *Greville, Scot. Cr. Fl. t.* 199. *Arn. Disp. Musc. p.* 21.

HAB. Dry rocks at a considerable elevation upon the Breadalbane mountains, plentiful; but always barren.

We have introduced this into the present division of the genus, and, we may add, into the genus itself, (although we are ignorant of the nature of the fruit and fruitstalk,) in consequence of its affinity with the preceding species, *Gr. spiralis.* We have, too, under that species noticed the differences between them. We shall, therefore, content ourselves with observing on the present plant, that, while the mass or tuft, which the stems form, is hard and tough, and firmly compacted when dry, yet when moist, so flaccid are the stems, that they can scarcely be handled without their falling down. In that state, too, they are of a rich deep brown colour, greenish at the extremities.

†† *Fruitstalks straight.*

\+ *Leaves hair-pointed.*

8. *Gr. leucophæa;* stems rather short tufted, leaves elliptical very hoary with long piliferous points, fruitstalk subexserted, cap-

sule ovate, teeth of the peristome often bifid and perforated, lid rostrate short. (SUPPL. TAB. III.)

Grimmia leucophæa. *Greville, in Wern. Trans. v. 4. Hobson, Brit. Mosses, v. 2. n. 24. Drummond, Musc. Scot. v. 2. n. 30. Arn. Disp. Musc. p. 21.*

Dicranum piliferum. *Schleich. Cat. (according to Mr. Arnott).*

Campylopus lævigatus? *Brid. Meth. p. 76.*

HAB. King's Park, Edinburgh, where it appears to have been first discovered by *R. Brown, Esq.* many years ago. *Dr. Greville* finds it there in great abundance upon the trap rocks. At Fairhead, on basalt, Coast of Fife.—*Mr. Arnott.*

The broad tufts of this plant, have, when dry, a singularly hoary appearance upon the dark trap rocks, in consequence of the long hair-points to their leaves. The lower leaves of all are, however, destitute of hairs and broader than the upper ones, which are almost exactly elliptical, and very similar indeed to those of *Gr. pulvinata*; but then the *seta* is straight and the *capsule* is smooth. Thus this plant has the leaves of *Gr. pulvinata*, and the fruit of *Gr. ovata.*

9. *Gr. ovata;* stems more or less elongated, leaves lanceolato-subulate gradually produced into long diaphanous hair-like points, their margins recurved, fruitstalk exserted, capsule ovate, teeth of the peristome often perforated and split, lid rostrate. (TAB. XIII.)

Grimmia ovata. *Web. et Mohr, It. Suec. t. 2. f. 4. Schwaegr. Suppl. v. 1. t. 24. Hook. in Fl. Lond. N. S. (with a fig.) Moug. et Nestl. n. 211. Hobson, Brit. Mosses, v. 2. n. 23. Drummond, Musc. Scot. v. 1. n. 24. Funck, Deutschl. Moose, t. 11. f. 5. Hook. Fl. Scot. P. II. p. 120. Brid. Meth. p. 36. Arn. Disp. Musc. p. 20.*

Dicranum ovatum. *Hedw. St. Cr. v. 3. t. 34. Schwaegr. Suppl. v. 1. p. 189.*

Dicranum ovale. *Hedw. Sp. Musc. p. 140. Smith, Fl. Brit. p. 1214. Engl. Bot. t. 2165. Turn. Musc. Hib. p. 77.*

Trichostomum ovatum. *Mohr.*

Grimmia obtusa. *Schwaegr. Suppl. t. 25. Moug. et Nestl. n. 458.*

Grimmia elliptica. *Funck, Deutschl. Moose, t. 11. f. 4.*

Campylopus ovatus. *Brid. Meth. p. 76.*

Campylopus cæspititius? *Brid. Meth. p. 77.*

Bryum ovale. *Dicks. Crypt. Fasc. 4. p. 14.*

HAB. Rocks, principally in alpine situations. *Mr. Drum-*

mond, however, finds it upon Tay side between Dundee and the Ferry.

We do not hesitate to make the *Gr. obtusa* of Schwaegrichen a synonym to this, since we have Mougeot and Nestler's specimens, which precisely accord with our plant, as indeed does Schwaegrichen's figure. From *Gr. pulvinata* it differs by not having the fruitstalks curved at any time, by its smooth capsule, and its narrow and gradually acuminated leaves.

10. *Gr. Doniana;* stems short, leaves lanceolato-subulate produced into long diaphanous hair-like points, their margins incurved, capsule ovate, teeth of the peristome quite entire, lid shortly rostrate. (Tab. XIII.)

Grimmia Doniana. *Smith, Fl. Brit. p.* 198. *Engl. Bot. t.* 1259. *Hobson, Brit. Mosses, v.* 1. *n.* 27. *Arn. Disp. Musc. p.* 20. *Hook. Fl. Scot. P. II. p.* 129.

Gr. sudetica? *Schwaegr. Suppl. t.* 24. *Funck, Deutschl. Moose, t.* 11. *n.* 10.

Hab. On rocks in mountainous districts, rare.

It must be confessed, the present species is so nearly allied to the preceding, that, if great importance were not always attached to the peristomes of Mosses, we should find it almost impossible to distinguish them. *Gr. Doniana* is, however, a very much smaller plant than *Gr. ovata*, and the leaves are of a brighter, though still a dark green colour, larger in proportion to the fruitstalks, which thus seem half immersed. The *teeth* of the peristome we have never been able to find either perforated or split; on which account we quote, hesitatingly, the *Gr. sudetica* of Schwaegrichen, which agrees well with our plant in other respects.

The lid, we may observe, is rather shorter and more obtuse than in *Gr. ovata*; but on this circumstance, much reliance cannot, we fear, be placed.

\+ + *Leaves destitute of a hair-like point.*

11. *Gr. unicolor;* stems elongated, leaves erecto-patent lanceolate obtuse rigid destitute of hair-like points, the margins incurved, capsule ovate, teeth narrow rather long mostly quite entire. (Suppl. Tab. III.)

Grimmia unicolor. *Hook. Fl. Scot. ed.* 2. *MSS. Drummond, Musc. Scot. v.* 2. *n.* 32. *Grev. Scot. Cr. Fl. t.* 123. *Arn. Disp. Musc. p.* 21.

HAB. Abundant on the steep, almost perpendicular, faces of bare exposed rock, above Bachnagairn, a hunting Lodge belonging to the Hon. D. Ogilvie at the head of Clova, Angusshire.—*Mr. Drummond.*

This rare moss has much the habit of *Trichostomum ellipticum;* the leaves are of an equally dark brown colour, and obtuse; but they are even more rigid, and their margins are much incurved. The capsule is longer, of a softer texture, and the peristome, which is deep red, is decidedly that of a *Grimmia.* Mr. Drummond mistook it at first for a variety of *Trichostomum microcarpum,* but independent of the difference in the generic character, the leaves in the latter are far more patent and more attenuated at their points.

The plant grows in very dense and broad tufts, and upon rocks so dry and so exposed to the sun, that in the summer it appears to be burned up and destroyed. The stems are from one to three inches long, sometimes throwing out, as Dr. Greville observes, slender, filiform, barren shoots, clothed with small ovate, imbricated *leaves;* all the leaves have a strong nerve reaching to the point. The seta is erect, straight or slightly flexuose. *Capsule* reddish brown; the *lid* conico-subulate. The *Calyptra,* at first, truly mitriform, afterwards, as in some *Trichostoma,* bursts on one side as it were by the enlargement of the capsule, and thence becomes dimidiate. *Teeth* quite entire.

XVI. PTEROGONIUM.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* single, of 16 entire, equidistant teeth; *Calyptra* dimidiate. (TAB. II.)

Mohr has, we think, contrary to nature, united this genus with *Weissia* and *Grimmia.* It bears the same affinity to *Weissia* as *Hypnum* does to *Bryum;* being distinguished by its branched

and creeping habit and lateral fructification. In its habit, and usually upright capsule, it is closely allied to *Neckera*, from which it is known by the single peristome.

1. *Pt. Smithii;* stems much branched, branches pinnate, leaves lingulate obtuse entire crisped when dry their margins recurved, nerve reaching about half way up, fruitstalks very short, lid rostrate. (Tab. XIV.)

   Pterogonium Smithii. *Swartz, in Schrad. Journ. v. 2. p. 173. Smith, Fl. Brit. p. 1271. Engl. Bot. t. 1326. Schwaegr. Suppl. v. 1. p. 105. and v. 2. p. 31. t. 109. Hobson, Brit. Mosses, v. 2. n. 25. Arn. Disp. Musc. p. 50.*

   Lasia Smithii. *Brid. Meth. p. 133.*

   Hypnum Smithii. *Dicks. Cr. Fasc. 2. p. 10. t. 5. f. 4. Hedw. Sp. Musc. p. 264. t. 68. f. 5—7.*

   Hab. Trunks of trees in the Southern parts of England; abundant in Devonshire.

   This elegant moss differs from the remaining British *Pterogonia*, in having its stems very much branched, and in these, as well as the leaves, curling remarkably when dry; the fruit, too, which is not commonly produced, is nearly sessile; the fruitstalk slightly curved.

2. *Pt. gracile;* branches fascicled curved, leaves broadly ovate acute concave, their margins plane summits serrated faintly two-nerved at the base, lid conical. (Tab. XIV.)

   Pterogonium gracile. *Swartz, Musc. Suec. p. 26. Smith, Fl. Brit. p. 1270. Engl. Bot. t. 1085. Schwaegr. Suppl. v. 1. p. 105. Brid. Meth. p. 126. Hobson, Brit. Mosses, v. 1. n. 26. Funck, Deutschl. Moose, t. 13. n. 5. Hook. Fl. Scot. P. II. p. 129. Arn. Disp. Musc. p. 49.*

   Pterigynandrum gracile. *Hedw. St. Cr. v. 4. t. 6.*

   Grimmia ornithopodioides. *Mohr.*

   Hypnum gracile. *Linn.*

   Hab. Rocks in subalpine countries, frequent.

   Miss Hutchins found a variety of this species with the leaves unusually broad, and the whole plant of a blackish green colour. A careful examination of good specimens of the fruit of this plant will exhibit something of an inner peristome, viz. a very narrow membrane as at the base of the cilise of *Neckera*, yet terminating so irregularly as not to justify us in placing this among the mosses which have a double peristome.

3. *Pt. filiforme;* stems irregularly branched curved, leaves ovate subacuminated concave their margins recurved serrated, nerve single or forked short faint, lid conical. (TAB. XIV.)

Pterogonium filiforme. *Hedw. St. Cr. v.* 4. *t.* 7. *Engl. Bot. t.* 2297. *Moug. et Nestl. n.* 210. *Hook. Fl. Scot. P. II. p.* 129. *Arn. Disp. Musc. p.* 49. *Schwaegr. Suppl. v.* 1. *p.* 100. *Brid. Meth. p.* 126. *Funck, Deutschl. Moose, t.* 13. *n.* 1.

Pt. cæspitosum. *Engl. Bot. t.* 2526.

Grimmia filiformis. *Mohr.*

Hypnum cylindricum. *Dicks. Crypt. Fasc.* 2. *p.* 12. *Smith, Fl. Brit. p.* 1280.

HAB. Mountains in Scotland and Ireland. Ben Lawers, common.—*Arnott* and *Greville.*

In this and the preceding species the leaves are closely imbricated and subsecund, but the present plant is the smaller and more slender of the two. The cellules of the leaves are larger than in *Pt. gracile,* and project on the back and margins, which gives the foliage a papillose appearance as in *Hypnum catenulatum, H. proliferum,* and a few others. The nerve of the leaf, though sometimes scarcely visible, is at others more evident, single, or forked so as to resemble that of *Pt. gracile.* We have examined specimens of the *Pt. cæspitosum* of *English Botany,* which differ in nothing from *Pt. filiforme,* but in being somewhat larger, and in having their branches less attenuate.

XVII. WEISSIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 16 entire, equidistant teeth; *Calyptra* dimidiate. (TAB. II.)

We cannot agree with Mohr in uniting this genus with the *Grimmiæ,* to which it bears a relation similar to that of *Didymodon* with *Trichostomum,* and of *Gymnostomum* with *Anictangium,* genera which are now universally adopted.

* *Capsule with an apophysis.*

1. *W. splachnoides;* leaves lingulate rounded at the top their

nerve disappearing below the summit, capsule obovate, apophysis obconical, lid convex acuminulate. (TAB. XIV.)

Weissia splachnoides. *Schwaegr. Suppl. v.* 1. *p.* 63. *t.* 17. *Brid. Meth. p.* 45. *Hook. Fl. Lond. (cum ic.) Fl. Scot. P. II. p.* 130. *Grev. Scot. Crypt. Fl. t.* 145. *Funck, Deutschl. Moose, t.* 9. *n.* 1. *Drummond, Musc. Scot. v.* 2. *n.* 33.

Grimmia splachnoides. *Smith, Fl. Brit. p.* 1197. *Engl. Bot. t.* 2164. ?

Splachnum lingulatum. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 6. *Smith, Fl. Brit. p.* 1177. *(excl. syn. Swartzii.) Engl. Bot. t.* 2095. *Brid. Meth. p.* 105.

Cytodon splachnoides. *Brown, in Parry's First Voyage.*

Dissodon splachnoides. *Grev. et Arn. in Wern. Trans.—Arn. Disp. Musc. p.* 13.

HAB. Turf bogs on the Scottish alps.

Although this plant has the habit, leaves, capsule, and apophysis, and the same place of growth as the *Splachna*, yet the peristome is undoubtedly divided into 16 distinct teeth, and these, when examined in a state of moisture, appear to be approximated in pairs, when dry and the teeth are erect, they seem to be placed at equal distances. This we find to be the case in several individuals which we have examined, and to this circumstance it may be owing that some authors have asserted that the teeth are equidistant, while others have remarked their being geminate. We have never been so fortunate as to have seen a *Calyptra*. An anonymous writer in the *Bot. Zeitung*, alleges that it is mitriform, and hence argues that this plant should be arranged among the *Splachna;* but Wahlenberg says "*Calyptra lateralis;*" and till we can be more certain on this point we prefer leaving it among the *Weissiæ*.

Mr. Arnott observes, that *W. splachnoides* has also each of the 16 teeth geminate;—a character which still farther connects it with the genus *Splachnum*, and which is not to be found in any other *Weissia*. Its columella is also that of a *Splachnum*.

The species most nearly allied to the present plant is *Splachnum reticulatum*, which, besides the configuration of the peristome, may be known by its smaller size, much shorter fruit-stalks, and ovate, not lingulate, leaves. In both mosses the leaves are remarkably obtuse, of a dark colour, strongly reticulated, and glossy when dry. The *Grimmia splachnoides*, figured in *Engl.*

Bot. resembles the subject of this description in the magnified capsule, but not in the leaves.

2. *W. Templetoni;* leaves ovato-lanceolate acute, capsule (with the apophysis) narrowly pyriform, lid nearly plane. (TAB. XIV.)

Weissia Templetoni. *Hook. in Fl. Lond. ed.* 2. *(cum ic.) Fl. Scot. P. II. p.* 130. *Arn. Disp. Musc. p.* 24. *Hobson, Brit. Mosses, v.* 2. *n.* 27.

Entosthodon Templetoni. *Schwaegr. Suppl. v.* 1. *p.* 44. *t.* 113.

Funaria Templetoni. *Engl. Bot. t.* 2524.

HAB. Wet banks in various parts of Ireland, and in Scotland; at Appin.—*Capt. Carmichael.*

This species, with the *W. radians* of Hedwig, has the same affinity to *Funaria* as *Pterogonium* has to *Hypnum*, viz. agreeing with it in general habit, and differing only in the want of the inner peristome; it may, at a future time, become the subject of a new genus. The apophysis is very narrow; and the teeth of the peristome lye horizontally over the mouth of the capsule, as do those of *Funaria.*

The late Dr. C. Schmidt sent us specimens from Teneriffe, and we have seen others from Egypt, that in all respects agree with our plant; we have not, however, an opportunity of identifying the peristome, owing to their imperfect state. The *Weissia longicolla* of Bridel is, in all probability, the same with the present species, though that author does not notice its very peculiar peristome.

* * *Capsule destitute of an apophysis.*

† *Leaves nerveless.*

3. *W. nuda;* stems scarcely any, leaves ovato-lanceolate nerveless, capsule ovate gibbous on one side cernuous. (TAB. XIV.)

Weissia nuda. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 43. *Fl. Scot. P. II. p.* 130. *Hobson, Brit. Mosses, v.* 1. *n.* 28. *Arn. Disp. Musc. p.* 24.

Conscinodon nudus. *Brid. Meth. p.* 48.

Grimmia nuda. *Smith, Fl. Brit. p.* 1197. *Engl. Bot. t.* 1421. *Turn. Musc. Hib. p.* 25.

Bryum nudum. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 15.
Weissia rosea. *Wahl. Fl. Lapp. t.* 19.
Weissia incarnata. *Schwaegr. Suppl. v.* 1. *p.* 66. *t.* 18.
HAB. On clayey soil in the north of England, and Scotland.

If there were not abundant other marks of discrimination to separate this from the rest of the British species of *Weissia*, the greater size of its annulus, and the nature of its teeth, which are broad, and split from their centre to their base, might be adduced as peculiarities of this singular plant. It is the only one, too, of its genus, which has the leaves destitute of a nerve; these, as maturity advances, become of a reddish colour, whence Wahlenberg's expressive name of *rosea*, and Schwaegrichen's scarcely less so of *incarnata*. We have, however, been obliged to retain the appellation given to it by its first describer, our late countryman and acute cryptogamist, Mr. Dickson. This moss still exists in the spot originally pointed out by Mr. Caley, near Manchester, whence we have received specimens from Mr. Hobson. The late Mr. Don found it by the sides of the Tay, near Perth.

†† *Leaves furnished with a nerve.*

\+ *Leaves ovate or lanceolate.*

4. *W. nigrita;* stems elongated, leaves lanceolate acuminated, capsule obovate cernuous gibbous sulcate, lid hemispherical obtusely pointed. (TAB. XIV.)

Weissia nigrita. *Hedw. St. Cr. v.* 3. *t.* 39. *Schwaegr. Suppl. v.* 1. *p.* 74. *Hook. Fl. Scot. P. II. p.* 130. *Brid. Meth. p.* 47. *Hobson, Brit. Mosses, v.* 2. *n.* 28. *Drummond, Musc. Scot. v.* 1. *n.* 27. *Funck, Deutschl. Moose, t.* 10. *f.* 13. *Arn. Disp. Musc. p.* 26.
Grimmia nigrita. *Smith, Fl. Brit. p.* 1195. *Engl. Bot. t.* 1825.
Bryum nigritum. *Dicks.*
HAB. Moist banks in mountainous districts, plentiful on Ben-y-gloe, near Blair in Athol.

This plant has a capsule still more remarkable for its inclination than the preceding, and is truly arcuato-cernuous. In all the remaining British *Weissiæ* the capsule is either erect or very nearly so.

5. *W. Starkeana;* stems very short, leaves ovate with an excurrent nerve, capsule ovate erect, lid conical, teeth of the peristome subulate acute. (TAB. XIV.)

Weissia Starkeana. *Hedw. St. Cr. v.* 3. *t.* 23. *Hook. Fl. Scot. P. II. p.* 130. *Schwaegr. Suppl. v.* 1. *p.* 68. *Brid. Meth. p.* 44. *Arn. Disp. Musc. p.* 24.

Grimmia Starkeana. *Smith, Fl. Brit. p.* 1186. *Engl. Bot. t.* 1490.

Bryum minutum. *Dicks.*

HAB. Banks and fields, in the middle and south of Britain.

That this is the *Weissia Starkeana* of Hedwig's *Stirpes*, there cannot, we think, be the least doubt; but that the following species has been frequently mistaken for it, the specimens in our possession, received from various friends, will clearly testify. In the present plant, however, the teeth are very apparent on the removal of the operculum from a fully formed capsule, nor are they so fugacious as the peristomes of many mosses of this family. The leaves are somewhat patent, ovate, sometimes inclining a little to lanceolate, acute, their margins slightly recurved, their nerve excurrent, and forming an apiculus.

6. *W. affinis;* stems very short, leaves ovate with an excurrent nerve, capsule ovate erect, lid conical, teeth of the peristome short broad obtuse. (TAB. XIV.)

Weissia affinis. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 44. *Arn. Disp. Musc. p.* 24.

HAB. Fields and on gravelly banks.

Except by its smaller size and paler colour, we know of no means whereby to discriminate this moss from the preceding one but by an examination of the peristome, and this is so strikingly different in the two, and each is so constant in its characters, that we think ourselves fully warranted in making two species of them. The peristome of *W. affinis* consists of 16 broad and very obtuse, somewhat membranaceous, whitish teeth, extremely faintly striated, and resembling, in all particulars, the peristome of *W. trichodes*, hereafter to be described; but in that plant the peristome first forms a horizontal, membranous ring about the mouth of the capsule, and then rolls back into 16 teeth, whereas in our plant we have always seen the peristome to be erect.

It may be remarked, that in the general growth and habit, and in the form and structure of the leaves, there is the greatest similarity between the present individual, (*W. Starkeana,*) and *W. lanceolata;* and their only essential differences are to be found in the operculum and teeth of the peristome.

7. *W. lanceolata;* stems somewhat elongated, leaves ovate with an excurrent nerve almost piliferous, capsule ovate, lid obliquely rostrate. (Tab. XIV.)

W. lanceolata. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 45. *Funck, Deutschl. Moose, t.* 9. *n.* 5. *Brid. Meth. p.* 47. *Arn. Disp. Musc. p.* 24. *Hook. Fl. Scot. P. II. p.* 130.

Leersia lanceolata. *Hedw. St. Cr. v.* 2. *t.* 23.

Grimmia lanceolata. *Smith, Fl. Brit. p.* 1186. *Engl. Bot. t.* 1408. *Moug. et Nestl. n.* 310.

Encalypta lanceolata. *Turn. Musc. Hib. p.* 19. *Schwaegr. Suppl. v.* 1. *p.* 61.

Weissia aciphylla. *Funck, Deutschl. Moose, t.* 9. *n.* 6.

Grimmia aciphylla. *Mohr.*

Conscinodon lanceolatus. *Brid. Meth. p.* 49.

Conscinodon aciphyllus. *Brid. Meth. p.* 49.

Conscinodon connatus. *Brid. Meth. p.* 50.

Bryum lanceolatum. *Dicks.*

Hab. On moist banks.

This plant is only to be distinguished from *W. Starkeana* (to which it is very nearly allied,) by the larger size, by the narrower leaves, their laxer reticulation and more excurrent nerve, and by its rostrate lid. In general habit it approaches *Gymnostomum truncatulum*, particularly the larger varieties of it, but its leaves are more erect and more closely imbricated, and the apiculus is longer. We have examined authentic specimens from Dr. Mohr of his *Grimmia aciphylla*, and we fully accord with Schwaegrichen that it is not to be distinguished from our plant.

8. *W. latifolia;* stems unbranched very short, leaves broadly obovate with a small acumen concave imbricated shining, the nerve reaching nearly to the point, capsule oblong cylindrical erect, lid rostrate. (Suppl. Tab. III.)

Weissia latifolia. *Schwaegr. Suppl. v.* 1. *p.* 64. *t.* 18. *Brid. Meth. p.* 44. *Funck, Deutschl. Moose, t.* 13. *n.* 9. *Grev. Scot. Crypt. Fl. t.* 149. *Arn. Disp. Musc. p.* 24.

Grimmia latifolia. *Web. et Mohr, Fl. Cr. Germ. p.* 147.

HAB. Mountains of Clova, Scotland, in the crevices of rocks, growing with *Didymodon glaucescens*, and *Oxytropis campestris.—Mr. Drummond*, 1824.

This valuable addition to the muscology of Britain has only been seen in one spot, and even there it is far from being abundant. In Switzerland, however, we have found it in great plenty; particularly in the famous Pass of the Gemmi. It is one of the most striking species of this genus, distinguished by the superior size and great breadth of its leaves, which are as closely imbricated as those of *Bryum argenteum*; they are very glossy, and their colour is a pale yellow green. The peristome consists of 16, rather long and gradually attenuated, pale, yellow teeth, distantly striated.

\+ \+ *Leaves linear or subulate.*

9. *W. striata*; leaves linear denticulate crisped when dry, capsule ovato-turbinate sulcate erect, lid obliquely subulate. (TAB. XV.)

α. minor; leaves linear-subulate, subserrulate.

Weissia striata. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 45. *Fl. Scot. P. II. p.* 130. *Arn. Disp. Musc. p.* 26. *Drummond, Musc. Scot. v.* 1, *p.* 29.

Grimmia striata. *Schrad. Diar. Bot. v.* 2. *p.* 57. *Smith. Fl. Brit. p.* 1185.

Weissia fugax. *Hedw. Sp. Musc. t.* 13. *Schwaegr. Suppl. v.* 1. *p.* 77. *Funck, Deutschl. Moose, t.* 10. *n.* 20. *Moug. et Nestl. n.* 407.

Weissia Schisti. *Schwaegr. Suppl. p.* 72. *t.* 20. *(not of Engl. Bot.)*

Grimmia Schisti. *Smith, Fl. Brit. p.* 1185.

β. major; leaves broadly-linear, denticulate.

Weissia denticulata. *Schwaegr. Suppl. v.* 1. *p.* 75. *t.* 19. *Brid. Meth. p.* 40. *Funck, Deutschl. Moose, t.* 10. *n.* 19.

Weissia pumila. *Brid. Meth. p.* 39.

HAB. Moist banks, and in the crevices of rocks in alpine countries. *β.* very fine at rocks upon the Isla, Angusshire.

The variety *β.*, the *W. denticulata* of Schwaegrichen, has the leaves strongly denticulate, and much broader than in the common appearance of *W. striata*; yet we have gathered so many specimens in intermediate states, that we cannot feel satisfied in considering them otherwise than as varieties. The

W. Schisti (of Schwaegr.) has the leaves more carinate and narrower. Of this state of *W. striata* we have seen none but foreign specimens; those from which the figure in *Engl. Bot.* is taken, being *W. acuta*. The capsules, in all the varieties, are sulcate, and have quite the same form; and the lid is constantly rostrate from a flat base.

10. *W. trichodes;* stems scarcely any, leaves subulato-setaceous entire, capsule ovate striated, lid rostrate. (Tab. XV.)

Weissia trichodes. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 45. *Hobson, Brit. Mosses, v.* 1. *n.* 32. *Funck, Deutschl. Moose, t.* 9. *f.* 10.

Gymnostomum trichodes. *Mohr, Crypt. Germ.—Brid. Meth. p.* 11. *Moug. et Nestl. t.* 711. *Arn. Disp. Musc. p.* 10. *Nees et Hornsch. Bryol. Germ.*

Anictangium trichodes. *Schwaegr. Suppl. v.* 1. *p.* 33. *t.* 12.

Hab. On granite rocks, moistened by the spray of a rivulet, near Dublin. Sandstone rocks, near Henfield, Sussex.—*Mr. Borrer.*

The curious peristome of this plant, in an early stage, presents only a membranous ring, lying horizontally within the edge of the mouth of the capsule; this, however, as maturity advances, splits into 16 equal, short, and very obtuse teeth, which become erect, and afterwards reflexed over the mouth of the capsule. In this state Mohr seems to have examined it, and consequently ranged it under his *Gymnostoma*. Schwaegrichen, taking into consideration the situation of the male flowers, has classed it under his *Anictangium*. An evident annulus is present. The minute plants, most nearly resembling this, and only to be distinguished from it by a close inspection, are *W. pusilla*, and *Gymnostomum tenue*.

11. *W. cirrata;* leaves broadly subulate crisped when dry their margins recurved, capsule ovate, lid rostrate. (Tab. XV.)

Weissia cirrata. *Hedw. Sp. Musc. t.* 12. *f.* 7. *Moug. et Nestl. n.* 406. *Hobson, Brit. Mosses, v.* 1. *n.* 31. *Funck, Deutschl. Moose, t.* 10. *n.* 16. *Schwaegr. Suppl. v.* 1. *p.* 75. *Arn. Disp. Musc. p.* 25. *Brid. Meth. t.* 41.

Grimmia cirrata. *Smith, Fl. Brit. p.* 1189. *Engl. Bot. t.* 2356.

Grimmia Dicksoni. *Smith, Fl. Brit. p.* 1189. *Engl. Bot. t.* 1420.

Mnium cirratum. *Linn.—Dill. Musc. t.* 48. *f.* 42.

Hab. On posts and rails, rarely on banks.

It will require a very attentive examination of the leaves of

this moss to distinguish it from *W. crispula*. In our plant the leaves are shorter, wider, carinate, and have their margins recurved; while in *W. crispula* they are truly subulate, rather canaliculate, and have no recurvation whatever of the margin. The capsules are alike in both.

12. *W. tenuirostris;* leaves linear-acuminate undulate waved and plane at the margin, capsule ovato-cylindrical, lid rostrate erect as long as the capsule. (SUPPL. TAB. III.)

HAB. Moist rocks; in fructification at Campsie, near Glasgow, Scotland.—About Powerscourt Waterfall, near Dublin, common, but barren.

We have frequently met with the barren stems of this plant, but it was not till we discovered it in fructification that we were able to determine upon its being a new species. *Stems* light green, flaccid, loosely tufted, about an inch long, branched, the branches spreading. *Leaves* lax, spreading, half an inch in length, keeled, flexuose, entire, waved at the margins, which are not at all recurved, their substance is rather thick, yet tender, composed of very minute cellules, so as to have no appearance of being reticulated, their nerve is strong and reaches to the point. *Fructification* very rare; *fruitstalks* scarcely an inch long, pale reddish-yellow, often two springing from the same perichætium; *capsule* ovato-cylindraceous, erect, with its sides unequal; *lid* subulate, straight, as long as the capsule, reddish-yellow; *calyptra* dimidiate. *Peristome* of 16 rather short, horizontal, equidistant, linear-subulate, somewhat torulose red teeth, with occasionally an oblong perforation near the base. The general habit of this plant is quite peculiar among the *Weissiæ*, having loosely entangled, spreading stems, and remarkably flaccid, patent leaves, beset with remarkably flexuose and spreading leaves, in these last particulars approaching to *Trichostomum Barbula, (Schwaegr.)* and still more to *Tortula tortuosa*. The peristome, however, which we have examined in perfect specimens, is unquestionably that of a *Weissia*, and covers the mouth of the capsule horizontally, as in *W. fugax*, the leaves of which are not unlike, in consistence, to those of *W. tenuirostris*. Among the individuals of this genus, its nearest affinity in the general form of the leaves and cylindrical

shape of the capsule is with *W. curvirostra*. The latter species, however, is abundantly distinguished by its erect, bright-red, wiry stems, its leaves much shorter and smaller, less waved, so distinctly recurved at the edges as to be marginate; but above all, by its lid, whose beak is far shorter, more obtuse, and oblique in its direction.

12. *W. curvirostra*; leaves linear-subulate marginate, capsule ovato-cylindrical, lid shortly rostrate. (Tab. XIV.)

Weissia curvirostra. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 46. *Brid. Meth. p.* 42. *Hook. Fl. Scot. P. II. p.* 130. *Arn. Disp. Musc. p.* 25. *Hobson, Brit. Mosses, v.* 1. *n.* 30. *Drummond, Musc. Scot. v.* 2. *n.* 34. *Moug. et Nestl. n.* 611. *Funck, Deutschl. Moose, t.* 10. *n.* 14.

Weissia recurvirostra. *Hedw. St. Cr. v.* 1. *t.* 7. *Schwaegr. Suppl. v.* 1. *p.* 74.

Grimmia recurvirostra. *Smith, Fl. Brit. p.* 1190. *Engl. Bot. t.* 1438.

Bryum curvirostrum. *Dicks.—Dill. Musc. t.* 48. *f.* 45.

Hab. On sandy or gravelly moist banks.

The stems of this plant vary exceedingly in length; and its whole habit, as Mr. Turner judiciously observes, much resembles that of the *Tortulæ*, in company with several species of which genus it may often be found growing. The nerve is dark and strong, and gives the leaves a peculiar rigidity.

13. *W. crispula*; stems divided, leaves from a broad base lanceolato-subulate crisped when dry their margins incurved, capsule ovato-elliptical, lid rostrate. (Tab. XV.)

Weissia crispula. *Hedw. Sp. Musc. t.* 12. *f.* 1—6. *Schwaegr. Suppl. v.* 1. *p.* 75. *Brid. Meth. p.* 42. *Hook. Fl. Scot. P. II. p.* 131. *Arn. Disp. Musc. p.* 25. *Funck, Deutschl. Moose, t.* 10. *n.* 17. *Drummond, Musc. Scot. v.* 1. *n.* 28.

Grimmia crispula. *Turn. Musc. Hib. p.* 28. *Smith, Fl. Brit. p.* 1192. *Engl. Bot. t.* 2203.

Hab. On rocks.

In addition to what we have said under *W. cirrata*, we may here add, that the present species is a smaller plant, and of a darker green colour, and that it has a more decided perichætium.

14. *W. controversa*; stems nearly simple, leaves lineari-subulate crisped when dry, their margins incurved, capsule ovato-elliptical, lid rostrate. (Tab. XV.)

Weissia controversa. *Hedw. St. Cr. v.* 3. *t.* 5. *Schwaegr. Suppl. v.* 1. *p.* 77. *Moug. et Nestl. n.* 16. *Hook. Fl. Scot. P. II. p.* 131. *Hobson, Brit. Mosses, v.* 2. *n.* 29. *Funck, Deutschl. Moose, t.* 10. *n.* 21. *Drummond, Musc. Scot. v.* 2. *n.* 35. *Arn. Disp. Musc. p.* 25.

Weissia viridula. *Brid. Meth. p.* 38.

Weissia microdus. *Schwaegr. Suppl. v.* 1. *p.* 77. *Brid. Meth. p.* 38.

Weissia curvicaulis. *Brid. Meth. p.* 39.

Weissia erythrogona. *Brid. Meth. p.* 39.

Weissia obscura? *Brid. Meth. p.* 40.

Grimmia controversa. *Smith, Fl. Brit. p.* 1177. *Engl. Bot. t.* 1367. *Turn. Musc. Hib. p.* 27.

Bryum viridulum. *Huds.*

Bryum virens. *Dicks.—Dill. Musc. t.* 48. *f.* 43.

HAB. Banks, very abundant.

This plant may be distinguished from *W. cirrata* by its having the leaves longer and more linear, with their margins by no means recurved; likewise from *W. crispula* by the former of these two characters; and from both by its smaller size. We have already noticed the similarity of this plant to *Gymnostomum microstomum*, than which it is larger, and has longer and finer fruitstalks. The teeth are of a very pale colour, and occasionally split, as in the genus *Dicranum*.

15. *W. calcarea*; stems scarcely any, leaves from a broad base linear obtuse thick with a very broad nerve, capsule turbinate, lid rostrate. (TAB. XV.)

Weissia calcarea. *Hedw. Sp. Musc. t.* 11. *f.* 1—6. *Hobson, Brit. Mosses, v.* 2. *n.* 30. *Funck, Deutschl. Moose, t.* 9. *n.* 8. *Schwaegr. Suppl. v.* 1. *p.* 115. *Brid. Meth. p.* 43. *Arn. Disp. Musc. p.* 25.

Weissia seligera. *Brid. Meth. p.* 43.

Grimmia calcarea. *Smith, Fl. Brit. p.* 1177. *Turn. Musc. Hib. p.* 25.

Bryum calcareum. *Dicks.—Engl. Bot. t.* 191.

HAB. On chalk cliffs and stones.

The short, upright, rigid leaves of this plant have a striking appearance, and resemble remarkably, in miniature, those of *Polytrichum aloides*, to which also their dense texture assimilates them, their upper half consisting almost entirely of their broad nerve, which below is much narrower, passing gradually on each side into the broad pagina.

16. *W. recurvata*; stems scarcely any, leaves subulate, capsule broadly ovate, fruitstalks curved, lid rostrate. (TAB. XV.)

Weissia recurvata. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 47. *Hob-*

son, Brit. Mosses, v. 1. *n.* 29. *Brid. Meth. p.* 43. *Moug. et Nestl. t.* 713. *Drummond, Musc. Scot. v.* 2. *n.* 36. *Arn. Disp. Musc. p.* 25.

Grimmia recurvata. *Hedw. St. Cr. v.* 1. *t.* 38. *Smith, Fl. Brit. p.* 1183. *Engl. Bot. t.* 1489. *Turn. Musc. Hib. p.* 24. *Schwaegr. Suppl. v.* 1. *p.* 83. *Funck, Deutschl. Moose, v.* 2. *n.* 32.

Bryum curvatum. *Dicks.*

HAB. On sandstone rocks;—upon rocks in the Den of Airly, Scotland.—*Mr. Drummond.*

The fruitstalk of this plant being always arched when growing, or, if moistened after having been gathered, sufficiently distinguishes this plant from *W. pusilla.*

17. *W. pusilla;* stems scarcely any, leaves subulate, capsule ovate, fruitstalks always erect, lid rostrate. (TAB. XV.)

Weissia pusilla. *Hedw. St. Cr. v.* 2. *t.* 29. *Funck, Deutschl. Moose, t.* 9. *n.* 9. *Schwaegr. Suppl. v.* 1. *p.* 68. *Brid. Meth. p.* 43. *Arn. Disp. Musc. p.* 25.

Grimmia pusilla. *Smith, Fl. Brit. p.* 1184. *Engl. Bot. t.* 2551.

Bryum paludosum. *Linn. Sp. Pl.?*

HAB. On calcareous rocks, usually.

Mr. Templeton alone seems to have found the true plant of this species growing in dense patches on the white limestone rocks in the neighbourhood of Belfast. We dare not quote the Dillenian figures, *t.* 49. *f.* 53. &c. usually referred to this moss, for neither in their appearance nor place of growth do they at all accord with our plant.

18. *W. verticillata;* stems branched, leaves broadly subulate nearly flat rather flaccid, capsule ovate, lid rostrate. (TAB. XV.)

Weissia verticillata. *Schwaegr. Suppl. p.* 71. *t.* 20. *Moug. et Nestl. t.* 507. *Funck, Deutschl. Moose, t.* 9. *n.* 12. *Arn. Disp. Musc. p.* 26.

Conscidonon verticillatus. *Brid. Meth. p.* 50.

Grimmia verticillata. *Turn. Musc. Hib. p.* 31. *Smith, Fl. Brit. p.* 1191. *Engl. Bot. t.* 1258.

Weissia capillacea. *Schwaegr. Suppl. v.* 1. *p.* 69. *n.* 19. *Brid. Meth. p.* 46.

Bryum fasciculatum. *Dicks.*

Bryum verticillatum. *Linn.—Dill. Musc. t.* 47. *f.* 35.

HAB. Among trickling water on rocks.

This singular species has the lower part of the stems frequently covered with a white earthy incrustation, which is found on the plant whatever be the nature of the rock on which

it grows, whether micaceous schistus, as at the Dargle, county of Wicklow, or sandstone, as in the south of Ireland, or on calcareous rocks, as at Aberdour, and Glen Tilt. The leaves are very plane, straight, erect, and almost appressed, and cellular in structure.

19. *W. acuta;* stems branched, leaves subulato-setaceous subsecund rigid canaliculate, capsule turbinate, lid rostrate. (TAB. XIV.)

Weissia acuta. *Hedw. St. Cr. v.* 3. *t.* 35. *Hobson, Brit. Mosses, v.* 2. *n.* 31. *Schwaegr. Suppl. v.* 1. *p.* 69. *Brid. Meth. p.* 47. *Funck, Deutschl. Moose, t.* 9. *n.* 11. *Moug. et Nestl. n.* 610. *Drummond, Musc. Scot. v.* 1. *n.* 30. *Arn. Disp. Musc. p.* 26. *Hook. Musc. Scot. P. II. p.* 131.

Grimmia acuta. *Turn. Musc. Hib. p.* 29. *Smith, Fl. Brit. p.* 1192. *Engl. Bot. t.* 1644.

Weissia rupestris. *Hedw. Sp. Musc. t.* 14.

Bryum acutum. *Dicks.*

Bryum splachnoides. *Dicks.—Dill. Musc. t.* 47. *f.* 34.

HAB. Rocks in alpine countries.

The leaves are remarkably rigid, and the capsule has a swelling at the base, resembling an apophysis. The whole plant varies much in size, and is, as Mr. Turner has noticed, of a shining brownish-green colour. In the former edition of this work, we had erroneously conceived that *Dicranum fulvellum* was the same as this moss, and had, therefore, added it as a synonym.

XVIII. DICRANUM.

GEN. CHAR. *Fruitstalks* terminal; (except in *D. adiantoides*, and *D. taxifolium.*) *Peristome* single, of 16 bifid, equidistant teeth; *Calyptra* dimidiate. (TAB. II.)

It is much to be regretted that this genus, including so great a number of species, and those frequently so anomalous in appearance, cannot be divided without departing from the principles now generally adopted by muscologists. The *Fissidentes* of Hedwig possess so remarkable a character in the form, structure, and di-

rection of their leaves, that we were almost tempted to deviate from the Linnæan rule of drawing the generic distinctions from the fructification, and to employ those solely founded on the difference of foliage. From this latter circumstance, however, an admirable character for the primary division of the species may be formed. Even in the true *Dicrana*, many vary from what we must still regard as the most essential character of the genus; viz. the regularly cleft teeth of the peristome. *D. virens* has the cleft often united at the apices of the segments. In *D. rufescens* the segments are unequal; in *D. spurium* frequently trifid. Those of *D. purpureum* are so deeply divided, that we have had no hesitation in removing it to the genus *Didymodon*, with which it likewise accords full as well in habit. Mohr cautions us to distinguish carefully between *Dicranum longifolium*, and the foreign *Didymodon longirostrum*, and between the likewise foreign *Dicr. tortile* and *Didymodon homomallum*, and *Weissia heteromalla*. This last, indeed, we believe, as we shall hereafter have occasion to mention, to be nothing more than our *Didymodon heteromallum*, of which the peristome had not been sufficiently examined. But there are other true *Weissiæ*, *W. acuta* in particular, which bear a very close affinity to *Dicranum*.

A. *Leaves inserted in a bifarious manner.*

(*Fissidens.* Hedw.)

1. *D. bryoides*; fruitstalks terminal, perichætial leaves resembling the cauline ones. (Tab. XVI.)

a. stem short simple, capsule erect.

Dicranum bryoides. *Swartz, Musc. Suec. t.* 2. *f.* 4. *Smith, Fl. Brit. p.* 1232. *Engl. Bot. t.* 625. *Turn. Musc. Hib. t.* 53. *Drummond, Musc. Scot. v.* 2. *n.* 38. *Hobson, Brit. Mosses, v.* 1. *n.* 33. *Hook. Fl. Scot. P. II. p.* 131. *Arn. Disp. Musc. p.* 27.

Fissidens bryoides. *Hedw. St. Cr. v.* 3. *t.* 29. *Schwaegr. Suppl. v.* 1. *P. II. p.* 7. *Funck, Deutschl. Moose, t.* 22. *n.* 3.

Hypnum bryoides. *Linn. Sp. Pl. p.* 1588.

Dicranum viridulum. *Swartz, Musc. Suec. t.* 2. *f.* 3. *Smith, Fl. Brit. p.* 1230. *Engl. Bot. t.* 1368.

Bryum viridulum. *Linn.—Dicks. Crypt. Fasc.* 1. *t.* 1. *f.* 5.—*Dill. Musc. t.* 34. *f.* 1.

Fissidens exilis. *Hedw. Sp. Musc. t.* 38. *f.* 7—10. *Funck, Deutschl.*

Moose, t. 22. *f.* 1. *Schwaegr. Suppl. v.* 1. *P. II. p.* 4. *Brid. Meth. p.* 187.

β. stem elongated, somewhat branched, capsule erect.

Dicranum osmundioides. *Turn. Musc. p.* 55. *Smith, Fl. Brit. p.* 1233. *Engl. Bot. t.* 1662.

Fissidens osmundioides. *Hedw. Sp. Musc. t.* 30. *f.* 7—11. *Schwaegr. Suppl. v.* 1. *P. II. p.* 7. *Funck, Deutschl. Moose, t.* 22. *n.* 4.

Fissidens asplenioides. *Schwaegr. Suppl. v.* 1. *P. II. p.* 8. *Brid. Meth. p.* 190. (to which may be added, according to Mr. Arnott, of the same author, *Fiss. elegans, Thunbergii, dicarpos and acacioides.*)

Hypnum asplenioides. *Dicks. Crypt. Fasc.* 2. *t.* 5. *f.* 5.

γ. stem short, simple, capsule inclined.

Dicranum tamarindifolium. *Turn. Musc. Hib. p.* 55. *Smith, Fl. Brit. p.* 1231.

Dicranum incurvum. *Mohr.*

Fissidens incurvus. *Schwaegr. Suppl. t.* 49.

Fissidens tamarindifolius. *Brid. Meth. p.* 187. and *F. crispus, longifolius,* and *linearis* of the same author.

Fissidens palmatus. *Hedw. St. Cr. v.* 3. *t.* 30. A.?

Dicranum palmatum. *Arn. Disp. Musc. p.* 27.?

HAB. Moist banks and in woods, abundant.

This little plant has the stems from half a line to full an inch in length, and these are either decumbent, ascendant, or erect. The leaves vary much in their size and figure on the same and on different individuals. In general the superior ones are the longest and of an oblongo-lanceolate form, the lower are much smaller and almost ovate, their margins mostly bounded by a pellucid line; the nerve is more or less strong, reaching to the point, and sometimes a little beyond it when the leaf becomes apiculate. The colour varies from a deep green, through all the intermediate tints, to a yellow brown. With regard to their insertion they are truly bifarious, distichous in direction, vertical. The structure of the leaves of this and the remaining species of the section is highly curious, and totally unlike that of any other plant with which we are acquainted. Besides being vertical, their upper half, (taking the nerve for the line of separation,) is from the base beyond the middle composed of two equal lamellæ, the lower part of which embraces the stem, as represented at *f.* 4. of *D. adiantoides,* (TAB. XVI.) and the rest very often embraces a portion of the leaf placed immediately above it.

We have not brought together such a variety of synonyms without a patient examination of specimens, as well as of the respective figures and descriptions. And, first, we have the authority of our able countryman, Mr. Turner, for considering the *Dicr. viridulum* of Swartz, (the *Fissidens exilis* of Hedwig,) to be the same as the *D. bryoides*. It is only characterized, as Mr. Turner observes, by being almost stemless, and in having few and approximate leaves. Mohr says of this, "caule declinato," in opposition to "caule erectiusculo," which is the only difference in his specific character; and those who will be at the trouble to examine various tufts of specimens will perceive the fallacy of such a mark. Then, with regard to *Fissidens osmundioides*, it differs from the more usual appearance of *D. bryoides* exactly as that does from *D. viridulum*. *D. tamarindifolium*, (*D. incurvum*, Mohr,) we have likewise made a variety; because the only ground of distinction which we can perceive is the curvation of the fruitstalk at its extremity, by which means the capsule becomes drooping, or, as Mohr expresses it, "subcernua;" for the degree of curvature is variable, and is sometimes so slight that it would be difficult to determine to which variety it should belong. Nor can we see how the Hedwigian *Fissidens palmatus* is to be distinguished, if it be not that its capsule is itself curved rather than the fruitstalk, and the beak of the lid is somewhat longer; and with regard to *F. longifolius*, Bridel himself says it is perhaps a variety of *F. palmatus*, although he takes no notice of the curved capsule. In all the varieties the capsule is nearly urceolate, and the lid has a subulate beak. *D. osmundioides* in *Engl. Bot.* is represented much branched, with innovations; a state in which it is found in very wet situations, although Wahlenberg says he has never seen it.

Varieties of *D. bryoides* we have in our possession, gathered by Mungo Park in the interior of Africa; and we scarcely see any decided characters by which the fine species *Fissidens asplenioides*, and *F. polypodioides* of Swartz may be distinguished from it.

2. *D. adiantoides*; fruitstalks lateral, perichætial leaves ovate, slightly convolute pointed. (Tab. XVI.)

Dicranum adiantoides. *Swartz, Musc. Suec. p.* 31. *Turn. Musc. Hib. p.* 57. *Smith, Fl. Brit. p.* 1234. *Moug. et Nestl. n.* 25. *Hook. Fl. Scot. P. II. p.* 131. *Arn. Disp. Musc. p.* 28. *Hobson, Brit. Mosses, v.* 2. *n.* 34. *Drummond, Musc. Scot. v.* 1. *n.* 32.

Fissidens adiantoides. *Hedw. St. Cr. v.* 3. *t.* 26. *Schwaegr. Suppl. v.* 1. *P. II. p.* 10. *Funck, Deutschl. Moose, t.* 22. *n.* 6. *Brid. Meth. p.* 191. and *F. grandifrons* of the same author, and *F. dubius* of Beauv.

Hypnum adiantoides. *Linn. Sp. Pl. p.* 1588. *Engl. Bot. t.* 264.— *Dill. Musc. t.* 34. *f.* 3.

HAB. Moist banks, wet pastures, and bogs.

From the last described species the present differs in being very much larger, frequently two inches long, branched by innovations, especially when growing in wet places, where our larger specimen was gathered by our kind friend, Mr. Dalton. The leaves are nearly lanceolate, more or less serrulate at the point; the base of the fruitstalk is surrounded by a remarkably scaly perichætium, whose leaves are very unlike the cauline ones, being ovate, concave, convolute, nerveless, except at the acuminated point, which has a vertical direction. The base of this perichætium is inserted laterally upon the stem of the plant, and always throws out reddish roots, exactly as the following species, from which it differs scarcely in any thing but in the point of insertion of the fruit. The fruitstalks are flexuose, the capsule inclined, and the lid subulate. Wahlenberg considers this as a variety of the following, perhaps not unjustly.

3. *D. taxifolium;* fruitstalks radicular, perichætial leaves ovate sheathing involute pointed. (TAB. XVI.)

Dicranum taxifolium. *Swartz, Musc. Suec. p.* 31. *Turn. Musc. Hib. p.* 56. *Smith, Fl. Brit. p.* 1233. *Hobson, Brit. Mosses, v.* 1. *n.* 35. *Drummond, Musc. Scot. v.* 1. *n.* 31. *Moug. et Nestl. n.* 217. *Hook. Fl. Scot. P. II. p.* 131. *Arn. Disp. Musc. p.* 28.

Fissidens taxifolius. *Hedw. Sp. Musc. t.* 39. *Schwaegr. Suppl. v.* 1. *P. II. p.* 10. *Brid. Meth. p.* 189.

Hypnum taxifolium. *Linn. Sp. Pl. p.* 1587. *Engl. Bot. t.* 416.— *Dill. Musc. t.* 34. *f.* 2.

HAB. Moist banks.

Plant from one half to three quarters of an inch in height, root thickly tufted, and sending up many stems. Fruit at the very base of the stems, and from among the roots; enveloped

at the base of the fruitstalk by a scaly perichætium, the leaves of which exactly resemble the last, and which also throws out roots from its base. Is it not possible that on the decay of the fructification it may become a perfect plant or frond? And may not the perichætium of *D. adiantoides* possess the same property, whence the growth of the plant by frequent innovations? *Fissidens subbasilaris* of Hedwig is hardly to be distinguished from this.

B. *Leaves inserted on all sides of the stem.*

a. *Leaves destitute of a nerve.*

4. *D. glaucum;* stems branched fastigiate, leaves erecto-patent ovato-lanceolate straight nerveless entire, capsule ovate cernuous, lid rostrate. (Tab. XVI.)

Dicranum glaucum. *Hedw. Sp. Musc. p.* 135. *Schwaegr. Suppl. v.* 1. *p.* 187. *t.* 48. *Turn. Musc. Hib. p.* 73. *Smith, Fl. Brit. p.* 1216. *Engl. Bot. t.* 2166. *Moug. et Nestl. n.* 23. *Hobson, Brit. Mosses, v.* 1. *n.* 36. *Funck, Deutschl. Moose, t.* 21. *n.* 26. *Hook. Fl. Scot. P. II. p.* 131. *Arn. Disp. Musc. p.* 29. *Brid. Meth. p.* 66.

Dicranum albidum. *Brid. Meth. p.* 67.

Bryum glaucum. *Linn. Sp. Pl.—Dill. Musc. t.* 46. *f.* 20. and *t.* 83. *f.* 8.

Hab. On bogs and wet heaths.

This species is remarkable for its having the habit, and nerveless reticulated leaves of a *Sphagnum*. The stems vary considerably in length: American specimens are figured by Dillenius, *t.* lxxxiii. *f.* 8. and it appears to be extensively scattered over the globe.

b. *Leaves furnished with a nerve.*

* *Leaves apiculate or piliferous.*

5. *D. latifolium;* stems short, leaves oblong concave entire apiculate or piliferous, capsule erect ovato-oblong, lid rostrate. (Tab. XVI.)

Dicranum latifolium. *Hedw. St. Cr. v.* 1. *t.* 33. *Turn. Musc. Hib. p.* 79. *Hook. Fl. Scot. P. II. p.* 132. *Hobson, Brit. Mosses, v.* 2. *n.* 32.

Didymodon latifolius. *Wahl.—Arn. Disp. Musc. p.* 34.

Cynodontium latifolium. *Schwaegr. Suppl. v.* 1. *p.* 110. *t.* 25.
Cynodon latifolius. *Brid. Meth. p.* 99.
Trichostomum latifolium. *Schwaegr. Suppl. v.* 1. *p.* 145. *Funck, Deutschl. Moose, t.* 17. *n.* 7.
Bryum piliferum. *Dicks.*
Trichostomum piliferum. *Engl. Bot. t.* 2536.
HAB. Banks in Ireland and Scotland, chiefly in mountainous situations.

Specimens of this plant from Le Jardin, on the chain of Mont Blanc, at an elevation of 8000 feet; those from Kamtschatka, and those from Greenland, agree in having shorter stems, yellower leaves, and pale-coloured narrower capsules than our native specimens; others again, gathered at an elevation of 6000 feet in the Swiss Alps, perfectly accord with what we have found near the level of the sea in the vicinity of Dublin. The nerve is frequently so far produced beyond the point of the leaf as to render the latter truly piliferous.

* * *Leaves not apiculate.*

† *Nerve very broad.*

6. *D. longifolium;* stems elongated, leaves very long subulato-setaceous falcato-secund serrulate their nerve very broad, capsule oblongo-ovate nearly erect, lid rostrate. (TAB. XVI.)

Dicranum longifolium. *Hedw. St. Cr. v.* 3. *t.* 9. *Schwaegr. Suppl. v.* 1. *p.* 176. *Brid. Meth. p.* 60. *Moug. et Nestl. n.* 318. *Arn. Disp. Musc. p.* 29.

HAB. In wet spots on rocks, Ireland. Upon Ben Voirlich, and Ben-y-Gloe, Scotland.

This species, which may be so easily distinguished from its congeners by its long and falcate leaves, furnished with a nerve occupying nearly their whole breadth, was first found in Ireland, in the county of Wicklow, under dripping rocks at Glenmalur.

7. *D. cerviculatum;* stems short, leaves lanceolato-subulate entire subsecund their nerve very broad, capsule ovate subcernuous strumose, lid rostrate. (TAB. XVI.)

Dicranum cerviculatum. *Hedw. St. Cr. v.* 3. *t.* 37. *Turn. Musc.*

Hib. p. 64. *Smith, Fl. Brit. p.* 1220. *Hobson, Brit. Mosses, v.* 1. *n.* 37. *Funck, Deutschl. Moose, t.* 22. *n.* 35. *Moug. et Nestl. n.* 615. *Schwaegr. Suppl. v.* 1. *p.* 193. *Brid. Meth. p.* 53. *Hook. Fl. Scot. P. II. p.* 132. *Engl. Bot. t.* 1661. *Arn. Disp. Musc. p.* 29. *Drummond, Musc. Scot. v.* 1. *n.* 37.

Dicranum pusillum. *Hedw. St. Cr. v.* 2. *t.* 29. *Smith, Fl. Brit. p.* 1219. *Engl. Bot. t.* 2491. *Schwaegr. Suppl. v.* 1. *p.* 193. *Brid. Meth. p.* 53.

Dicranum flavidum. *Schwaegr. Suppl. v.* 1. *p.* 192. *t.* 45. *Brid. Meth. p.* 53.

Dicranum uncinatum. *Smith, Fl. Brit. p.* 1207. *Engl. Bot. t.* 2261. *Brid. Meth. p.* 53.

Dicranum sudeticum. *Schwaegr. Suppl. v.* 1. *p.* 175. *t.* 45. *Brid. Meth. p.* 61.

Bryum uncinatum. *Dicks. Crypt. Fasc.* 4. *p.* 11. *t.* 11. *f.* 8.

Bryum cerviculatum. *Dicks. Crypt. Fasc.* 3. *p.* 7.

Bryum parvulum. *Dicks. Crypt. Fasc.* 3. *p.* 7.

HAB. On bogs and moist banks.

The stems are very short, and the dense patches have the stramineous colour of those of a *Splachnum*, when growing, as is most frequently the case, on the black rotten soil of turf bogs.

8. *D. flexuosum;* stems nearly simple rigid, leaves lanceolato-subulate acuminated straight, their nerve very broad, fruit-stalks flexuose, capsule ovate striated, lid rostrate. (TAB. XVI.)

Dicranum flexuosum. *Hedw. Sp. Musc. t.* 38. *Turn. Musc. Hib. p.* 74. *Engl. Bot. t.* 1491. *Moug. et Nestl. t.* 123. *Smith, Fl. Brit. p.* 1229. *Hook. Fl. Scot. P. II. p.* 132. *Funck, Deutschl. Moose, t.* 21. *n.* 28. *Hobson, Brit. Mosses, v.* 1. *n.* 38. *Schwaegr. Suppl. v.* 1. *p.* 189. *Arn. Disp. Musc. p.* 33.

Thesanomitrion flexuosum. *Arn. Disp. Musc. p.* 33.

Campylopus flexuosus. *Brid. Meth. p.* 71.

Weissia immersa. *Brid. Meth. p.* 48.

Bryum immersum. *Dicks.*

Bryum fragile. *Dicks.*

β. *nigro-viride;* stems elongated, blackish green; leaves often piliferous.

Campylopus pilifer. *Brid. Meth. p.* 72.

Sphagnum alpinum. *Linn.—Dill. Musc. t.* 47. *f.* 33. and *t.* 32. *f.* 3.

HAB. On turf bogs, and wet rocks.

This plant is liable to such variations in size and colour, that many varieties have been pointed out by authors which we have scarcely thought it useful to separate, having seen the plant

so often in completely intermediate states. The more common appearance of this moss, and indeed the only one met with on plains, has very short stems and pale yellow leaves, which are so fragile as generally to be met with broken off, and lying upon the tufts in considerable quantities, looking at first not unlike the dimidiate calyptræ of this genus; and hence the *Br. fragile* of Dickson. The alpine varieties, and those found on wet rocks, have stems sometimes a span in length; are generally of a blackish colour, with leaves diaphanous at their points, and rarely producing fructification. The calyptra of this and of its foreign affinities is fringed at the base with long ciliæ, as represented in *Musc. Hib.* in the cryptogamic part of Humboldt's *Botany of South America*, and in our figure, TAB. XVI, although this singularity in its structure has been generally overlooked by botanists.

†† *Nerve narrow.*

\+ *Capsule with a struma.*

9. *D. virens;* stems elongated, leaves from a broad sheathing base subulate, their margins recurved crisped when dry pointing in all directions, capsule smooth oblongo-cylindrical subcernuous strumose, lid rostrate. (TAB. XVII.)

Dicranum virens. *Hedw. St. Cr. v.* 3. *t.* 32. *Turn. Musc. Hib. p.* 69. *Smith, Fl. Brit. Engl. Bot. t.* 1462. *Hook. Fl. Scot. P. II. p.* 132. *Schwaegr. Suppl. v.* 1. *p.* 194. *Funck, Deutschl. Moose, t.* 22. *n.* 33. *Drummond, Musc. Scot. v.* 2. *n.* 41. *Arn. Disp. Musc. p.* 29. *Brid. Meth. p.* 54.

HAB. In marshy places, upon mountains. Abundant upon Ben Lawers.

This is always an alpine plant. British specimens differ from continental ones by having longer points to the leaves, which are entire.

10. *D. Schreberianum;* stems rather short simple tufted, leaves squarrose from a very broad sheathing base suddenly subulate crisped when dry, capsule ovate subcernuous, struma distinct, lid rostrate curved. (SUPPL. TAB. III.)

Dicranum Schreberianum. *Hedw. Sp. Musc. p.* 144. *t.* 33. *Schwaegr. Suppl. v.* 1. *p.* 179. *Funck, Deutschl. Moose, t.* 21. *n.* 21.

Brid. Meth. p. 64. *Arn. Disp. Musc. p.* 64. *Grev. Scot. Crypt. Fl. t.* 116. *Moug. et Nestl. n.* 719.

Bryum crispum. *Schreb. Spicil. p.* 79.

HAB. Upon the ground on an old neglected road in Glen Tilt, at the foot of Ben-y-Gloe, on a clayey soil.—Greville and Hooker, 1823.

This moss has the habit of *D. squarrosum*, but with a distinct struma, and leaves that are remarkable for their broad sheathing bases; the whole plant too is much smaller and more slender.

It seems to be very rare in Scotland. In the broadly tufted manner of its growth it resembles *D. varium*.

11. *D. strumiferum;* stems elongated, leaves from a broad sheathing base subulate entire their margins plane crisped when dry pointing in all directions, capsule furrowed oblongo-ovate subcernuous strumose, lid rostrate. (TAB. XVII.)

Dicranum strumiferum. *Ehrh. Crypt. n.* 74. *Engl. Bot. t.* 2410. *Smith, Fl. Brit. p.* 1228. *Moug. et Nestl. n.* 125. *Drummond, Musc. Scot. v.* 2. *n.* 42. *Schwaegr. Suppl. v.* 1. *p.* 194. *Brid. Meth. p.* 54. *Funck, Deutschl. Moose, t.* 22. *n.* 34. *Arn. Disp. Musc. p.* 129. *Hook. Fl. Scot. P. II. p.* 132.

Weissia inclinans. *Brid. Meth. p.* 42.

Fissidens strumifer.. *Hedw. St. Cr. v.* 2. *t.* 32.

Bryum inclinans. *Dicks.—Brid. Meth. p.* 120.

HAB. On marshy places in alpine situations.

Except that the margins of the leaves of this species are not recurved as in the preceding, and that its capsule is shorter and furrowed, there is scarcely a mark of distinction to be found between them.

12. *D. polycarpum;* stems elongated branched, leaves patent directed to every side lanceolato-subulate their margins recurved flexuose subserrulate crisped when dry, capsule oblongo-ovate nearly erect furrowed when old, struma scarcely gibbous, lid rostrate. (TAB. XVIII.)

Dicranum polycarpum. *Ehrh. Crypt. No.* 84. *(according to Smith.) Smith, Fl. Brit. p.* 1227. *Engl. Bot. t.* 2269. *Moug. et Nestl. n.* 414. *Schwaegr. Suppl. v.* 1. *p.* 179. *Arn. Disp. Musc. p.* 29. *Funck, Deutschl. Moose, t.* 20. *n.* 17.

Fissidens polycarpus. *Hedw. St. Cr. v.* 2. *t.* 31. *(not good.)*

HAB. Alpine rocks.

Hedwig's figure of this plant has much misled us in the first edition of this work; he has represented the old capsules as quite smooth, although (what we before had omitted to observe,) he has described them as sulcated. Hence we were induced to believe that another moss, *Didymodon Bruntoni* of the present work, was intended by Hedwig.

With regard to the *D. polycarpum*, indeed, we think, and we are not singular in this opinion, that it can hardly be distinguished from *D. strumiferum*. The differences are that the capsule of the former is more erect, less deeply furrowed, the struma scarcely gibbous, and the leaves have a narrow recurved margin.

13. *D. falcatum*; stems nearly simple, leaves long lanceolato-subulate falcato-secund nearly entire, capsule ovate subcernuous strumose, lid rostrate. (TAB. XVII.)

Dicranum falcatum. *Hedw. Sp. Musc. t.* 32. *f.* 1—7. *Smith, Fl. Brit. p.* 1208. *Engl. Bot. t.* 1989. *Schwaegr. Suppl. v.* 1. *p.* 190. *Funck, Deutschl. Moose, t.* 21. *n.* 31. *Hobson, Brit. Mosses, v.* 2. *n.* 33. *Drummond, Musc. Scot. v.* 1. *n.* 36. *Brid. Meth. p.* 53. *Hook. Fl. Scot. P. II. p.* 132. *Arn. Disp. Musc. p.* 32.

Bryum longifolium. *Dicks.*

HAB. On alpine rocks.

The present species is so closely allied to *D. heteromallum*, that we are almost tempted to consider it as merely a variety of that plant. However, the struma at the base of its capsule is of a very decided kind, and the leaves are more falcate.

14. *D. Starkii*; stems somewhat branched, leaves lanceolato-subulate falcato-secund entire, capsule oblongo-ovate suberect strumose, lid rostrate. (TAB. XVII.)

Dicranum Starkii. *Web. et Mohr, Fl. Crypt. Germ.—Engl. Bot. t.* 2227. *Schwaegr. Suppl. v.* 1. *p.* 191. *t.* 46. *Brid. Meth. p.* 53. *Funck, Deutschl. Moose, t.* 31. *f.* 32. *Moug. et Nestl. n.* 413. *Drummond, Musc. Scot. v.* 1. *n.* 35. *Hook. Fl. Scot. P. II. p.* 132. *Arn. Disp. Musc. p.* 31.

HAB. On alpine rocks.

The capsules of this species are longer than those of the preceding, to which it bears, we must confess, a very strong resemblance. The figures in *Engl. Bot.*, as well as in *Schwaegr. Suppl.*, represent the capsules as being longer than those of any specimens we have yet seen. We found this

moss on Ben Nevis, growing to the size of four or five inches, with the leaves large in proportion, yet differing in no other particular from the general appearance of the plant. It is also common in the same state on the Cairngorum mountains, Ben-y-Gloe, and Ben Lawers. This moss has perichætial leaves, not unlike those of *D. scoparium*.

+ + *Capsule without a struma.*

15. *D. flavescens;* stems branched, leaves long lanceolate serrulate pointing in all directions crisped when dry, capsules oblong erect, lid rostrate. (TAB. XVII.)

Dicranum flavescens. *Engl. Bot. t.* 2263. *Smith, Fl. Brit. p.* 1224. *Brid. Meth. p.* 63. *Drummond, Musc. Scot. v.* 2. *n.* 40. *Hook. Fl. Scot. P. II. p.* 132. *Arn. Disp. Musc. p.* 30.

Dicranum gracilescens. *Web. et Mohr.—Schwaegr. Suppl. v.* 1. *p.* 180. *t.* 46. *Funck, Deutschl. Moose, t.* 21. *n.* 22.?

Bryum flavescens. *Dicks.*

HAB. On wet sand, under the banks of rocky rivers.

We have some doubt in quoting the synonym of Mohr, as he describes his plant to have longer capsules.

16. *D. squarrosum;* stems somewhat branched, leaves from a broad sheathing base lanceolate obtuse recurved and patent directed to every side crisped when dry, capsule ovate subcernuous, lid rostrate. (TAB. XVII.)

Dicranum squarrosum. *Schrad. Journ. an.* 1802. *Turn. Musc. Hib. p.* 69. *Smith, Fl. Brit. p.* 1225. *Schwaegr. Suppl. v.* 1. *p.* 182. *t.* 47. *Engl. Bot. t.* 2004. *Moug. et Nestl. n.* 246. *Hobson, Brit. Mosses, v.* 1. *n.* 39. *Hook. Fl. Scot. P. II. p.* 133. *Drummond, Musc. Scot. v.* 1. *n.* 41. *Arn. Disp. Musc. p.* 30. *Brid. Meth. p.* 50.

Bryum palustre. *Dicks.—Dill. Musc. t.* 46. *f.* 24.

HAB. In very wet situations among mountains.

The stems vary in length from one to three inches. This is the most squarrose of the British *Dicrana*.

Mr. Arnott observes to us that this moss has a decided struma, and that Bridel has arranged it in the division "*capsula strumosa*."—Upon examining perfect capsules, we confess ourselves unable to see any thing of the kind; so that at any rate, this character is not constant.

17. *D. pellucidum;* stems branched, leaves lanceolate their mar-

gins slightly undulated serrated rather obtuse pointing in all directions, capsule ovate subcernuous, lid rostrate. (TAB. XVII.)

Dicranum pellucidum. *Swartz, Musc. Suec. p.* 35. *Turn. Musc. Hib. p.* 68. *Smith, Fl. Brit. p.* 1223. *Engl. Bot. t.* 1346. *Moug. et Nestl. n.* 122. *Schwaegr. Suppl. v.* 1. *p.* 181. *t.* 48. *Hobson, Brit. Mosses, v.* 1. *n.* 40. *Drummond, Musc. Scot. v.* 1. *n.* 42. *Brid. Meth. p.* 62. *Hook. Fl. Scot. P. II. p.* 133. *Arn. Disp. Musc. p.* 30.

Bryum pellucidum. *Linn. Sp. Pl. p.* 1583.—*Dill. Musc. t.* 46. *f.* 23.

HAB. On wet sides of streams and rivers.

The more ovate, short, somewhat truncate and decidedly inclined capsules, furnish the principal distinction between this plant and *D. flavescens.*

18. *D. spurium;* stems elongated, leaves ovate concave erecto-patent directed to every side the superior ones lanceolate serrulate, capsule oblong curved, lid rostrate. (TAB. XVII.)

Dicranum spurium. *Hedw. St. Cr. v.* 2. *t.* 30. *Smith, Fl. Brit. p.* 1222. *Schwaegr. Suppl. v.* 1. *p.* 179. *Brid. Meth. p.* 65. *Moug. et Nestl. n.* 319. *Funck, Deutschl. Moose, t.* 20. *n.* 16. *Hook. Fl. Scot. P. II. p.* 133. *Arn. Disp. Musc. p.* 30.

Bryum spurium. *Dicks.*

HAB. In bogs, Yorkshire;—*Mr. Teesdale.* Kinnordy, Scotland;—*Mr. Lyell;* always barren.

This singular species, somewhat allied to *D. scoparium, D. undulatum,* and the continental *D. Schraderi,* differs from them all in the breadth of the leaves, most of which are ovate, the upper ones being longer and narrower, and serrated at the points. The teeth of the peristome of this, as well as some other species of this genus, will not always be found to be divided into two segments only; very frequently three divisions are apparent.

19. *D. crispum;* stems short, leaves from a sheathing base setaceous nearly distichous flexuoso-recurved crisped when dry, capsule ovate erect, lid with a long beak. (TAB. XVII.)

Dicranum crispum. *Hedw. St. Cr. v.* 2. *t.* 33. *Turn. Musc. Hib. p.* 65. *Smith, Fl. Brit. p.* 1207. *Engl. Bot. t.* 1151. *Schwaegr. Suppl. v.* 1. *p.* 179. *Brid. Meth. p.* 64. *Drummond, Musc. Scot. v.* 1. *n.* 38. *Hook. Fl. Scot. P. II. p.* 133. *Hobson, Brit. Mosses, v.* 2. *n.* 34. *Funck, Deutschl. Moose, t.* 20. *n.* 19. *Arn. Disp. Musc. p.* 33.

Bryum vaginale. *Dicks.*

HAB. On moist banks.

This species has a strong resemblance to the *D. Schreberianum* of Hedwig and this work, which, however, decidedly differs by its shorter and wider leaves, by its inclined capsule and shorter lid.

20. *D. Scottianum;* stems branched, leaves erecto-patent directed to every side subulate, their margins plane subserrated crisped when dry, capsule ovato-cylindraceous nearly erect, lid with a long beak. (TAB. XVIII.)

Dicranum Scottianum. *Turn. Musc. Hib. t.* 6. *f.* 1. *Smith, Fl. Brit. p.* 1226. *Engl. Bot. t.* 1977. *Hook. Fl. Scot. P. II. p.* 133. *Arn. Disp. Musc. p.* 31. *Hobson, Brit. Mosses, v.* 2. *n.* 35.

Dicranum flagellare. *Hedw. St. Cr. v.* 3. *t.* 1.? *Funck, Deutschl. Moose, t.* 20. *n.* 14.? *Smith, Fl. Brit. p.* 1206. *Engl. Bot. n.* 1977. *Moug. et Nestl. n.* 511.

Dicranum montanum. *Hedw. Sp. Musc. p.* 35.? *Smith, Fl. Brit. p.* 1228. *Schwaegr. Suppl. v.* 1. *p.* 178. *Funck, Deutschl. Moose, t.* 20. *n.* 18. *Moug. et Nestl. n.* 614.

Dicranum strictum. *Schwaegr. Suppl. t.* 43.

Campylopus Scottianus. *Brid. Meth. p.* 72.

HAB. On rocks in mountainous districts.

This plant differs from Hedwig's *D. flagellare* principally by the direction of the leaves, which in the latter are constantly secund, yet we shall not be surprised if future observations on authentic specimens may prove them to be the same. We can find *D. montanum*, Hedw. to differ only by the smaller size, and perhaps by its somewhat wider capsule; but even in this particular we find native specimens of our plant to vary. If we may pronounce from Schwaegrichen's figure and description, we should suppose his *D. Hostianum* to be also the same as our plant.

22. *D. undulatum;* stems elongated, leaves nearly plane lanceolate attenuate serrulate at the points transversely undulate, capsule cylindraceous cernuous, lid with a long beak. (TAB. XVIII.)

Dicranum undulatum. *Ehrh. (not of Schrad.) Turn. Musc. Hib. p.* 59. *Smith, Fl. Brit. p.* 1203. *Engl. Bot. t.* 2260. *Drummond, Musc. Scot. v.* 1. *n.* 34. *Hook. Fl. Scot. P. II. p.* 133. *Arn. Disp. Musc. p.* 30.

Dicranum polysetum. *Swartz.—Schwaegr. Suppl. v.* 1. *p.* 165. *t.* 41. *Funck, Deutschl. Moose, t.* 19. *n.* 3.

Dicranum rugosum. *Brid. Meth. p.* 57.

HAB. In woods; also on rocks.

This species, which by the older Botanists was confounded with *D. scoparium*, as well as with the foreign *D. Schraderi*, bears the more striking resemblance to the latter, whose character is, however, to have more obtuse and carinate leaves, with their nerve disappearing before the points. With *D. scoparium* our plant agrees in having very remarkable perichætia, one of which encloses two, three, and even four fruitstalks; in some foreign species allied to this we have seen as many as seven. The transverse undulations of the leaves may be perceived on the plant while growing, although this appearance becomes more evident in dried specimens.

23. *D. scoparium*; stems elongated, leaves narrow subulate canaliculate secund, capsule cylindraceous arched cernuous, lid with a long beak. (TAB. XVIII.)

α. majus; stems two or three inches in length, leaves falcato-secund.

Dicranum scoparium. *Hedw. Sp. Musc. p.* 126. *Smith, Fl. Brit. p.* 1201. *Turn. Musc. Hib. p.* 58. *Moug. et Nestl. n.* 120. *Funck, Deutschl. Moose, t.* 19. *n.* 1. *Hook. Fl. Scot. P. II. p.* 133. *Arn. Disp. Musc. p.* 30. *Hobson, Brit. Mosses, v.* 1. *n.* 41. *Drummond, Musc. Scot. v.* 1. 33. *Schwaegr. Suppl. v.* 1. *p.* 162. *t.* 42. *Brid. Meth. p.* 56.

Dicranum majus. *Turn. Musc. Hib. p.* 58. *Smith, Fl. Brit. p.* 1202. *Engl. Bot. t.* 1490. *Schwaegr. Suppl. v.* 1. *p.* 103. *t.* 40. *Funck, Deutschl. Moose, t.* 19. *n.* 2.

Bryum scoparium. *Linn.—Engl. Bot. t.* 354.—*Dill. Musc. t.* 46. *f.* 16.

β. fuscescens; smaller, leaves subsecund, narrower, somewhat more crisped when dry.

Dicranum fuscescens. *Turn. Musc. Hib. p.* 60. *Smith, Fl. Brit. p.* 1204. *Engl. Bot. t.* 1597. *Brid. Meth. p.* 58. *Arn. Disp. Musc. p.* 30.

Dicranum congestum. *Schwaegr. Suppl. v.* 1. *p.* 168. *t.* 42. *Funck, Deutschl. Moose, t.* 19. *n.* 5. *Brid. Meth. p.* 57.

Dicranum longirostre. *Schwaegr. Suppl. v.* 1. *p.* 170. *t.* 44.

HAB. Woods and hedges. *β.* principally in mountainous countries.

This plant, which is found scattered over various and distant parts of the globe, and which may be met with in the darkest

woods as well as in open bogs, is liable to no small degree of variation in size as well as in the direction of the leaves. The larger variety, with more falcate leaves, has been distinguished by the name of *D. majus;* while on the other hand, the smaller plant, with leaves scarcely, if at all secund, has been called *D. fuscescens.*

24. *D. varium;* stems short, leaves narrow hastato-lanceolate, capsule ovate, lid rostrate. (Tab. XVII.)

α. viride; leaves pointing in all directions, lanceolate, green; capsules subcernuous.

Dicranum varium. *Hedw. St. Cr. v.* 2. *t.* 34. *Turn. Musc. Hib. p.* 65. *Smith, Fl. Brit. p.* 1209. *Engl. Bot. t.* 1215. *Hobson, Brit. Mosses, v.* 1. *n.* 42. *Moug. et Nestl. n.* 718. *Drummond, Musc. Scot. v.* 1. *n.* 39. *Hook. Fl. Scot. P. II. p.* 134. *Arn. Disp. Musc. p.* 32. *Schwaegr. Suppl. v.* 1. *p.* 174. *Brid. Meth. p.* 61. *Funck, Deutschl. Moose, t.* 20. *n.* 11.

Dicranum rigidulum. *Swartz, Musc. Suec. t.* 3. *f.* 7. *Hedw. Sp. Musc. t.* 32. *Schwaegr. Suppl. v.* 1. *p.* 174. *Smith, Fl. Brit. p.* 1211. *Brid. Meth. p.* 61. *Funck, Deutschl. Moose, t.* 20. *n.* 10.

Dicranum callistomum. *Smith, Fl. Brit. p.* 1211.

Bryum callistomum. *Dicks.*

β. rufescens; leaves subsecund, lanceolato-subulate, reddish; capsules erect.

Dicranum rufescens. *Turn. Musc. Hib. p.* 66. *Engl. Bot. t.* 1216. *Smith, Fl. Brit. p.* 1210.

Bryum rufescens. *Dicks.*—*Dill. Musc. t.* 50. *f.* 59.

γ. luridum; leaves subsecund, subulate, of a lurid colour; capsules subcernuous.

Hab. On moist banks.

After an attentive examination of numerous specimens of *D. varium,* and *D. rufescens,* we have considered it most prudent to make the latter a variety; for notwithstanding that *D. varium,* in occasional plants, has leaves decidedly falcate, of a greener colour, and firmer texture, with an entire margin, and its capsules inclining; while some individuals of *D. rufescens* have their leaves of a reddish colour, with an evident reticulation, serrated margin and with erect capsules; yet we have met with specimens partaking so much of the characters of both, that it seemed impossible to determine to which they should be referred. Our *var. γ.* has leaves still longer than those of *rufescens,* but not serrated, nor so strongly reticulated; with the capsules as in *α.* We cannot find the *D. rigidulum,* and

D. callistomum to differ in any way from our common *D. varium*.

25. *D. heteromallum;* stems branched, leaves subulate falcato-secund nearly entire, capsule ovate subcernuous, lid with a long beak. (TAB. XVIII.)

Dicranum heteromallum. *Hedw. St. Cr. v.* 1. *t.* 26. *Turn. Musc. Hib. p.* 61. *Smith, Fl. Brit. p.* 1204. *Engl. Bot. t.* 1272. *Moug. et Nestl. n.* 121. *Hobson, Brit. Mosses, v.* 1. *n.* 43. *Drummond, Musc. Scot. v.* 1. *n.* 40. *Funck, Deutschl. Moose, t.* 19. *n.* 7. *Hook. Fl. Scot. P. II. p.* 134. *Schwaegr. Suppl. v.* 1. *p.* 173. *Brid. Meth. p.* 59. *Arn. Disp. Musc. p.* 32.

Dicranum orthocarpum. *Hedw. Sp. Musc. t.* 30. *Schwaegr. Suppl. v.* 1. *p.* 176. *Brid. Meth. p.* 59. *Arn. Disp. Musc. p.* 32.

Dicranum curvatum. *Hedw. Sp. Musc. t.* 31. *Schwaegr. Suppl. v.* 1. *p.* 172. *Brid. Meth. p.* 58. *Funck, Deutschl. Moose, t.* 19. *n.* 8. *(capsule more erect.)*

Dicranum interruptum. *Hedw. Sp. Musc. t.* 29. *Schwaegr. Suppl. v.* 1. *p.* 172. *Smith, Fl. Brit. p.* 1205.—*Dill. Musc. t.* 47. *f.* 37 and 38.

HAB. On moist banks.

We have noticed above that this species can scarcely be distinguished from *D. falcatum* and *D. Starkii*, but by the absence of a struma at the base of the capsule.

26. *D. subulatum;* stems branched, leaves from a broad sheathing base subulato-setaceous secund entire, capsule ovate subcernuous, lid with a long beak. (TAB. XVIII.)

Dicranum subulatum. *Hedw. Sp. Musc. t.* 34. *Turn. Musc. Hib. p.* 63. *Smith, Fl. Brit. p.* 1206. *Engl. Bot. t.* 1273. *Schwaegr. Suppl. v.* 1. *p.* 173. *Funck, Deutschl. Moose, t.* 20. *n.* 9. *Brid. Meth. p.* 59. *Arn. Disp. Musc. p.* 32. *Drummond, Musc. Scot. v.* 2. *n.* 39.

HAB. Moist banks. About Forfar, Scotland. Highland mountains, not unfrequent.—*Mr. Drummond.*

Mohr united this species with the preceding one, and we must confess that we can perceive no other differences than those mentioned in our specific characters.

27. *D. fulvellum;* stems rather short thickly tufted simple, leaves subulato-setaceous scarcely secund those of the perichætium convolute, fruitstalk scarcely longer than the leaves, capsule erect turbinate sulcated when old, lid conico-rostrate. (SUPPL. TAB. III.)

Dicranum fulvellum. *Smith, Fl. Brit. p.* 1209. *Engl. Bot. t.* 2268. *Grev. Scot. Crypt. Fl. t.* 188. *(excellent.) Arn. Disp. Musc. p.* 32.
Bryum fulvellum. *Dicks. Crypt. Fasc.* 4. *t.* 11. *f.* 1.
Dicranum rupestre. *Web. et Mohr.*
Dicranum Seligeri. *Brid. Meth. Musc. p.* 59.

HAB. Crevices of rocks, Ben More.—*Mr. Dickson.* Ben Nevis.—*Mr. Borrer.* Ben Lawers.—*Drs. Hooker and Greville.* Not uncommon on the Clova mountains.—*Mr. Drummond.*

This moss has so completely the habit of *Weissia acuta* that we were erroneously led to refer it to that plant in the first edition of this work. Subsequent observations have convinced us of our error. The peristome is very large, bright red, bifid, or cut into laciniæ of various lengths, and sometimes perforated with clefts.

XIX. TRICHOSTOMUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* of 16 equal teeth divided to the base, or 32 placed together in pairs; *Calyptra* mitriform. (TAB. II.)

We need only repeat here what we have already said under the genus *Grimmia*, that it, and the present one are very closely allied, both in natural and essential character. *Trichostomum* is to *Didymodon*, what *Grimmia* is to *Weissia*.

* *Fruitstalks curved.*

1. *T. patens;* stems elongated, leaves lanceolate acuminated carinated their margins recurved more or less piliferous, capsule oblongo-ovate, fruitstalks curved, lid conical. (TAB. XIX.)

a. majus; leaves suberect, rather rigid, destitute of hair points.

Trichostomum patens. *Schwaegr. Suppl. v.* 1. *p.* 152. *t.* 37. *Moug. et Nestl. n.* 214. *Hook. Fl. Scot. P. II. p.* 134. *Hobson, Brit. Mosses, v.* 2. *n.* 37. *Drummond, Musc. Scot. v.* 1. *n.* 43. *Funck, Deutschl. Moose, t.* 18. *n.* 16.? *Arn. Disp. Musc. p.* 22.
Campylopus patens. *Brid. Meth. p.* 73.

Dicranum patens. *Smith, Fl. Brit. p.* 1213. *Engl. Bot. t.* 1990.
Bryum patens. *Dicks. Crypt. Fasc.* 8. *t.* 4. *f.* 8.
Trichostomum obtusum. *Smith, Fl. Brit. p.* 1244.
Racomitrion obtusum. *Brid. Meth. p.* 79.—*Dill. Musc. t.* 17. *f.* 30.
β. *piliferum*; leaves subpatent, rather flaccid, hair-pointed.
Trichostomum funale. *Schwaegr. Suppl. v.* 1. *p.* 150. *t.* 37. *Arn. Disp. Musc. p.* 22.
Campylopus funalis. *Brid. Meth. p.* 75.

HAB. α. Scotch, Welsh, and Irish mountains, as Snowdon, &c. β. Appin, Argyleshire.—*Capt. Carmichael.* Devonshire.—*Mr. Tozer.* Rocks on the Clova mountains.—*Mr. Drummond.*

Since the publication of the first edition, we have met with a *Trichostomum*, which, different as it may appear at first sight from *T. patens*, we are yet unable to separate from it specifically. This is the *var.* β. above mentioned, corresponding in every respect with the *T. funale* of Schwaegrichen, except that the lid is rostrate. With regard to the more general appearance of the plant, the original specimens of Dillenius and Dickson accord precisely with our variety α. *majus*; especially in having a sulcated capsule, thus differing from that of Schwaegrichen, which is both figured and described "theca lævi." This we have never observed; we know, however, that the *T. incurvum* of Hoppe and Hornschuch is precisely our *T. patens*.

In specimens sent by Mr. Drummond, the capsule is longer, sometimes striated, and sometimes smooth.

* * *Fruitstalks straight.*

† *Leaves with diaphanous points.*

2. *T. lanuginosum*; stems elongated subpinnate, leaves lanceolato-subulate acuminate their long diaphanous points serrated, margins recurved, capsule ovate, fruitstalks short on lateral branches, lid rostrate. (TAB. XIX.)

Trichostomum lanuginosum. *Hedw. St. Cr. v.* 3. *t.* 2. *Swartz, Musc. Suec.*—*Turn. Musc. Hib. p.* 38. *Smith, Fl. Brit. p.* 1240. *Engl. Bot. t.* 1348. *Schwaegr. Suppl. v.* 1. *p.* 149. *Moug. et Nestl. n.*

21. *Hook. Fl. Scot. P. II. p.* 134. *Hobson, Brit. Mosses, v.* 1. *n.* 44. *Drummond, Musc. Scot. v.* 2. *n.* 44. *Funck, Deutschl. Moose, t.* 17. *n.* 8. *Arn. Disp. Musc. p.* 22.

Racomitrion lanuginosum. *Brid. Meth. p.* 79.

Bryum hypnoides. *α. Linn. Sp. Pl.—Dill. Musc. t.* 47. *f.* 32.

HAB. On mountains, especially at some considerable elevation. It has likewise been found on the flat heaths in Norfolk by the *Rev. James Layton.*

This species, very common in mountainous countries, can scarcely be mistaken for any of its congeners. The stems are sometimes a foot or more in length, and have an irregularly pinnated appearance; and the fruitstalks, without an attentive observation of the branches on which they stand may be taken for lateral.

3. *T. canescens;* stems elongated irregularly branched, leaves ovato-lanceolate their diaphanous acuminated points slightly serrated, capsule ovate, teeth of the peristome very long and filiform, lid subulate. (TAB. XIX.)

Trichostomum canescens. *Hedw. St. Cr. v.* 3. *t.* 5. *Turn. Musc. Hib. p.* 39. *Smith, Fl. Brit. p.* 1242. *Engl. Bot. t.* 2434. *Moug. et Nestl. n.* 20. *Hook. Fl. Scot. P. II. p.* 134. *Schwaegr. Suppl. v.* 1. *p.* 147. *Funck, Deutschl. Moose, t.* 17. *n.* 10. *Hobson, Brit. Mosses, v.* 2. *n.* 38. *Drummond, Musc. Scot. v.* 1. *n.* 44. *Arn. Disp. Musc. p.* 22.

Racomitrion canescens. *Brid. Meth. p.* 78.—*Dill. Musc. t.* 47. *f.* 27. B. and *f.* 31.

Trichostomum ericoides. *Schrad.—Turn. Musc. Hib. p.* 38. *Smith, Fl. Brit. p.* 1241. *Engl. Bot. t.* 1991. *Schwaegr. Suppl. v.* 1. *p.* 147. *t.* 38. *Moug. et Nestl. t.* 409. *Funck, Deutschl. Moose, t.* 17. *n.* 9.

Racomitrion ericoides. *Brid. Meth. p.* 78.

Racomitrion canadense. *Brid. Meth. p.* 80.

Bryum ericoides. *Dicks. Crypt. Fasc.* 4. *p.* 14.

HAB. On heaths and in mountainous countries; also on the sandy beach near Yarmouth.

The *T. ericoides* of authors has somewhat of a pinnated appearance, arising from its numerous very short branches; but in the form of its leaves, capsule, and peristome, it perfectly accords with *T. canescens.*

4. *T. heterostichum;* stems elongated branched, leaves ovato-lanceolate their diaphanous acuminated points slightly serrated, capsule cylindrical, teeth of the peristome rather short, lid rostrate. (TAB. XIX.)

Trichostomum heterostichum. *Hedw. St. Cr. v. 2. t. 25. Turn. Musc. Hib. p. 37. Smith, Fl. Brit. p. 1239. Engl. Bot. t. 1347. Schwaegr. Suppl. v. 1. p. 149. Moug. et Nestl. n. 119. Hook. Fl. Scot. P. II. p. 134. Hobson, Brit. Mosses, v. 2. n. 39. Funck, Deutschl. Moose, t. 17. n. 11. Arn. Disp. Musc. p. 22.*

Racomitrion heterostichum. *Brid. Meth. p. 79.*

Racomitrion alopecurum. *Brid. Meth. p. 79.*

Bryum heterostichum. *Dicks.—Dill. Musc. t. 47. f. 27.* A. and F. and G.

HAB. On stones in mountainous districts.

It is by no means an easy task to distinguish between this and the preceding species without an examination of the peristome, where the principal and most important difference certainly lies. The teeth of the fringe in this moss are much shorter, and split after the manner of a *Dicranum*, but nearly to the base; while those of *T. canescens* are very long and filiform. The capsule, too, presents a slight difference, being ovate in *T. canescens*, and oblong or cylindraceous in *T. heterostichum*.

5. *T. microcarpon;* stems elongated branched, leaves lanceolate their diaphanous acuminated points slightly serrated, capsule ovate, teeth of the peristome rather short, lid rostrate. (TAB. XIX.)

Trichostomum microcarpon. *Hedw. Sp. Musc. t. 23. f. 8—12. Turn. Musc. Hib. p. 40. Smith, Fl. Brit. p. 1243. Engl. Bot. t. 1440. Schwaegr. Suppl. v. 1. p. 150. Moug. et Nestl. n. 315. Hook. Fl. Scot. P. II. p. 154. Hobson, Brit. Mosses, v. 2. n. 40. Drummond, Musc. Scot. v. 2. n. 45. Funck, Deutschl. Moose, t. 18. n. 14. Arn. Disp. Musc. p. 22.*

Racomitrion microcarpum. *Brid. Meth. p. 79.*

Dicranum aciculare. *γ. gracile. Turn. Musc. Hib. p. 67.*

Trichostomum sudeticum. *Funck, Deutschl. Moose, t. 18. n. 15.—Dill. Musc. t. 47. f. 29.*

HAB. On rocks.

We have noticed, in some specimens, the diaphanous appearance at the tops of the leaves quite to vanish, which has induced us to include in our synonyms Mr. Turner's acute-leaved variety of his *Dicranum aciculare;* in other particulars the two plants do not at all differ.

† † *Leaves never diaphanous at the points.*

6. *T. aciculare;* stems elongated branched, leaves lanceolate

obtuse serrulated at the points their nerve vanishing before the summit, capsule oblong, lid rostrate. (Tab. XIX.)

Trichostomum aciculare. *Pal. de Beauv. Prodr. p.* 90. *Moug. et Nestl. n.* 22. *Hook. Fl. Scot. P. II. p.* 135. *Schwaegr. Suppl. v.* 1. *p.* 156. *Funck, Deutschl. Moose, t.* 18. *n.* 19. *Hobson, Brit. Mosses, v.* 1. *n.* 45. *Drummond, Musc. Scot. v.* 1. *n.* 46. *Arn. Disp. Musc. p.* 23.

Dicranum aciculare. *Hedw. St. Cr. v.* 3. *t.* 33. *Turn. Musc. Hib. p.* 67. *Smith, Fl. Brit. p.* 1212. *Engl. Bot. t.* 1978.

Racomitrion aciculare. *Brid. Meth. p.* 80.

Trichostomum riparium. *Web. et Mohr.—Schwaegr. Suppl. v.* 1. *p.* 158. *t.* 39. *Funck, Deutschl. Moose, t.* 18. *n.* 20.

Racomitrion obtusifolium. *Brid. Meth. p.* 80.

Racomitrion aquaticum. *Brid. Meth. p.* 80.—*Dill. Musc. t.* 46. *f.* 25 and 26. B.

Hab. In water, or on very wet rocks and stones.

This moss has the leaf singularly obtuse. The colour varies from black, as it occurs in alpine rivulets, to yellowish green, as it is found in less wet situations. A variety of this plant with secund leaves bears some resemblance to *Hypnum palustre.* We do not at all see upon what ground the *T. riparium* of Weber and Mohr, and of Schwaegr. (*t.* 39.) is considered distinct from *T. aciculare.*

7. *T. fasciculare;* stems elongated branched, leaves lanceolate entire their summits never diaphanous their margins recurved, capsule ovato-oblong, lid rostrate. (Tab. XIX.)

Trichostomum fasciculare. *Schrad. Sp. p.* 51. *Schwaegr. Suppl. v.* 1. *p.* 155. *t.* 38. *Turn. Musc. Hib. p.* 39. *Smith, Fl. Brit. p.* 1243. *Engl. Bot. t.* 2005. *Moug. et Nestl. n.* 215. *Hook. Fl. Scot. P. II. p.* 135. *Drummond, Musc. Scot. v.* 1. *p.* 47. *Hobson, Brit. Mosses, v.* 1. *n.* 47. *Arn. Disp. Musc. p.* 23.

Racomitrion fasciculare. *Brid. Meth. p.* 80.

Bryum lutescens. *Dicks.*

Bryum hypnoides. β. *Linn. Sp. Pl. p.* 1585.—*Dill. Musc. t.* 47. *f.* 28. and *t.* 46. *f.* 26. C.

Hab. On rocks in the mountains.

The acute entire leaves, and brighter yellowish-green colour of this plant distinguish it easily from the preceding. The want of the diaphanous serrulate points keeps it apart from *T. cañescens* and its allies. It is by no means a moss of uncommon occurrence; the stems are from one to three inches long.

8. *T. polyphyllum;* stems branched, leaves lanceolato-subulate

their margins recurved serrated above very much crisped when dry, capsule oblong, lid rostrate. (TAB. XIX.)

Trichostomum polyphyllum. *Schwaegr. Suppl. v.* 1. *p.* 153. *t.* 39. *Turn. Musc. Hib. p.* 35. *t.* 7. *Smith, Fl. Brit. p.* 1225. *Moug. et Nestl. n.* 410. *Funck, Deutschl. Moose, t.* 18. *n.* 17. *Hook. Fl. Scot. P. II. p.* 135. *Hobson, Brit. Mosses, v.* 1. *n.* 46. *Drummond, Musc. Scot. v.* 1. *n.* 49. *Arn. Disp. Musc. p.* 23.

Dicranum polyphyllum. *Engl. Bot. t.* 1217.

Bryum polyphyllum. *Dicks.*

Bryum serratum. *β. Huds.*

Trichostomum cirratum. *Smith, Fl. Brit. p.* 1239.—*Dill. Musc. t.* 48. *f.* 41.

Racomitrion polyphyllum et falcifolium? *Brid. Meth. p.* 82.

HAB. Rocks and mountains.

This species may be easily known from the other *Trichostoma* by the greater length and narrowness of its leaves, and by their remarkably crisped appearance when in a dry state. It grows in tufts about an inch or two inches in height, and varies in colour from a light straw-yellow to a dark green. The capsules are generally crowded, and the teeth of the peristome connected at the base in filiform pairs.

9. *T. ellipticum;* stems short nearly simple, leaves lanceolate acuminate straight their nerve broad, their margins plane, capsule elliptical, lid rostrate. (TAB. XIX.)

Trichostomum ellipticum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 63. *Drummond, Musc. Scot. v.* 1. *n.* 48.

Dicranum ellipticum. *Turn. Musc. Hib. p.* 76. *t.* 6. *Smith, Fl. Brit. p.* 1213. *Engl. Bot. t.* 1901. *Schwaegr. Suppl. v.* 1. *p.* 184. *t.* 47.

Grimmia elliptica. *Arn. Disp. Musc. p.* 21.

Campylopus ellipticus. *Brid. Meth. p.* 76.

HAB. Mountain rocks. Summit of Ben Lomond, and upon rocks above the head of Loch Eil;—not uncommon on Ben Lawers and Ben Voirlich. Very fine on the mountains of Clova.—*Mr. Drummond.*

The capsules of this moss have a very neat and polished appearance. It may be confounded with *Grimmia ovata;* but as Mr. Turner, its original discoverer, has correctly observed, the absence of the diaphanous points to the leaves will always sufficiently define our present plant. The teeth are broad, often cleft, as in *Dicranum*, but more deeply. The habit is very nearly that of *Grimmia ovata.*

XX. GLYPHOMITRION.

GEN. CHAR. *Fruitstalks* terminal; *Capsule* without an apophysis; *Peristome* simple, of 16 teeth, approximated in pairs, reflexed when dry; *Calyptra* covering the whole capsule, entire, or rarely cleft on one side, and laciniated. (TAB. XIII.)

Mr. Brown has just observed that the following curious moss is allied to the genus *Orthotrichum*, especially in the approximation of its teeth to one another in pairs. We know of no species of that genus, however, in which the teeth are of so firm and rigid a texture, of so bright a red colour, or so strongly transversely striated. Upon the calyptra we consider the essential character to rest; this, even when the capsule has arrived at its full size, envelops the whole, embracing with its base the summit of the seta. It is quite destitute of hairs, obscurely furrowed, very thin and membranous, irregularly cleft at the base, and often splitting open laterally like that of the genus *Calymperes*, to which we cannot help thinking this plant to be very nearly allied.

If Schwaegrichen had not followed Bridel in adopting the generic appellation of *Glyphomitrion*, we should assuredly have preferred the more recent one of *Griffithia*, employed by Mr. Brown; the more so, as Bridel framed his character chiefly with a view to include the *Encalypta crispata* of Hedwig, (our *Orthotrichum crispatum*,) and *E. parasitica*, both of which individuals are stated to have 16 entire, equidistant teeth, and the former of which at least has a calyptra exactly similar to the other tropical *Orthotricha*. That author was entirely ignorant of the nature of the teeth in the present plant. Schwaegrichen has with propriety excluded the Hedwigian *Encalypta* from the genus *Glyphomitrion*, and we adopt the latter as constituted by him, together with his important character of the approximation of the teeth in pairs; but, instead of attending to the male flowers, we obtain a further mark of distinction from the calyptra.

1. *Glyphomitrion Daviesii.* (TAB. XIII.)

Gyphomitrion Daviesii. *Brid. Meth. p.* 31. *Schwaegr. Suppl. v.* 3. *p.* 41. *t.* 113.

Grimmia Daviesii. *Turn. Musc. Hib. p.* 24. *Hooker and Greville, in Edin. Journ. of Science, v.* 1. *p.* 131.

Encalypta Daviesii. *Engl. Bot. t.* 1281.

Griffithia Daviesii. *Brown, in Linn. Trans. v.* 12. *p.* 575.

HAB. Upon rocks, generally by the sea-shore, on the western coast of England and Wales. Common in similar situations in Ireland, especially on the basaltic columns of the Giant's Causeway.

Stems rarely exceeding half an inch in height, tufted, bearing a considerable resemblance in habit to *Gymnostomum lapponicum*, and an equally strong one to *Trichostomum polyphyllum*. *Leaves* lanceolato-acuminate, carinate, entire, of a dark brownish-green colour; much crisped when dry; those of the perichætium broad and convolute. *Capsule* turbinate, beautifully smooth and regular in its form, brown. *Lid* shortly conical, with a rather long and sharp beak.

This moss appears to be confined to the British Islands.

XXI. LEUCODON.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* single, of 32 teeth, closely united in pairs; *Calyptra* dimidiate. (TAB. II.)

We have adopted, with much satisfaction, Schwaegrichen's genus *Leucodon*, published in the second part of his valuable Supplement to Hedwig's *Species Muscorum*. The only British species has been severally thrown among the *Dicrana*, *Trichostoma*, and *Pterogonia*; from any of which an attentive consideration of its lateral fruit, deeply-divided teeth, and dimidiate calyptra, will keep its genus distinct. The teeth are very narrow, whitish, and sometimes appear united at their tops; but this appearance may arise from our taking as the subjects of our observations capsules in too young a state; since in specimens which have been gathered fresh from the trees, and in a state where the lid had naturally fallen off, the teeth appeared as deeply divided, and the divisions

as separate, filiform, and jointless as in some species of *Didymodon.*

L. sciuroides; leaves closely imbricated ovato-cordate acuminate striated, capsule oblong. (Tab. XX.)

Leucodon sciuroides. *Schwaegr. Suppl. v.* 2. *p.* 1. *Hook. Fl. Scot. P. II. p.* 135. *Funck, Deutschl. Moose, t.* 22. *n.* 1. *Hobson, Brit. Mosses, v.* 1. *n.* 51. *Brid. Meth. p.* 134. *Arn. Disp. Musc. p.* 50.

Leucodon Morensis. *Schwaegr. Suppl. v.* 1. *P. II. p.* 2. and *v.* 2. *P. I. t.* 125. *Brid. Meth. p.* 134.

Leucodon alopecurus? *Brid. Meth. p.* 135.

Dicranum sciuroides. *Swartz.—Smith, Fl. Brit. p.* 1215. *Engl. Bot. t.* 1903.

Trichostomum sciuroides. *Mohr.*

Pterogonium sciuroides. *Turn. Musc. Hib. p.* 32.

Hypnum sciuroides. *Linn. Sp. Pl.* 1596.—*Dill. Musc. t.* 41. *f.* 54.

Hab. Trunks of trees, in England, common. In Scotland rare:—near Invermoriston, where it was found by *Messrs. Greville* and *Hooker*, is the most northern habitation known for this plant.

Stems long, creeping on the bark of trees. *Branches* ascendant, from one to two or three inches in length, simple or ramified; often swelling towards the centre, and sharper towards the point, sometimes cylindrical; *leaves* concave, nerveless, but striated, the margins entire; those of the perichætium long, cylindrical, sheathing, especially the interior ones, which are half as long as the fruitstalk, and closely enveloping it. *Fruitstalks* lateral, about an inch long; *lid* rostrate.

Several extra-european species of this beautiful genus have now been figured in the *Musci Exotici* of Dr. Hooker. The *Leucodon canariensis* of Schwaegrichen belongs to this genus; though it is figured in the work just mentioned under the name of *Hedwigia Schmidtii.* Its peristome has been detected, lodged in the interior of the fallen operculum, by Mr. Arnott. Bridel and Schwaegrichen do not appear to have observed any thing but the remains of the peristome, which Hooker has incorrectly described as a membranous ring. With regard to the *L. Morensis* of Schwaegrichen, (*Hypnum Morense*, Schleicher,) we have numerous specimens received from Schleicher himself, and others that we have gathered in Switzerland, and can safely assert that they differ in nothing from the common

appearance of our plant except in having the branches somewhat shorter and more tumid. The "folia octofaria oblique imbricata" may often be seen as distinctly upon our specimens of *L. sciuroides* as upon *L. Morensis*.

The fructification is very scarce in this country;—fine specimens of it have been gathered by Mr. Lyell in the New Forest.

XXII. DIDYMODON.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 16 or 32 teeth approaching in pairs, or united at the base; *Calyptra* dimidiate. (TAB. II.)

In natural habit the plants of this genus are allied on the one hand to the *Weissiæ*, and on the other to the *Dicrana*. With the former, two species are liable to be confounded, viz. *Didymodon inclinatum*, and *D. heteromallum*, each of which has but 16 teeth, and their approximation in pairs is with difficulty discoverable. In *D. nervosum* and *purpureum*, besides being united in pairs at the base, we find them connected in various parts of their length by transverse bars; and in *D. nervosum* their direction appears not erect but oblique. The teeth of *D. trifarium* approximate very closely in pairs; those of *D. capillaceum* and *heteromallum* less so; moreover, in the latter each tooth has frequently a longitudinal cleft down its centre.

* *Capsules inclined.*

1. *D. purpureum;* stems scarcely branched, leaves lanceolate acuminate carinated their margins recurved entire, capsule ovato-cylindraceous oblique-substrumose furrowed when dry, lid conical. (TAB. XX.)

Didymodon purpureum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 65. *Hook. Fl. Scot. P. II. p.* 135. *Arn. Disp. Musc. p.* 35. *Hobson, Brit. Mosses, v.* 1. *n.* 48. *Drummond, Musc. Scot. v.* 2. *n.* 49.

Dicranum purpureum. *Hedw. Sp. Musc. t.* 36. *Turn. Musc. Hib. p.* 72. *Smith, Fl. Brit. p.* 1217. *Engl. Bot. t.* 2262. *Moug. et Nestl. n.* 24. *Schwaegr. Suppl. v.* 1. *p.* 183. *Funck, Deutschl. Moose, t.* 21. *n.* 25. *Brid. Meth. p.* 69.

Mnium purpureum. *Linn.*

Dicranum purpurascens. *Hedw. Sp. Musc. t.* 35. *Schwaegr. Suppl. v.* 1. *p.* 184. *Brid. Meth. p.* 69.

Dicranum strictum. *Smith, Fl. Brit. p.* 1218. *Engl. Bot. t.* 2294.

Trichostomum papillosum. *Smith, Fl. Brit. p.* 1238. *Engl. Bot. t.* 2533.

Bryum papillosum. *Dicks. Crypt. Fasc.* 4. *n.* 12. *t.* 11. *f.* 5.

Dicranum papillosum. *Brid. Meth. p.* 102.

Bryum strictum et tenue. *Dicks.*

Bryum bipartitum. *Dicks.—Engl. Bot. t.* 2357.

Dicranum Celsii. *Hedw. Sp. Musc. t.* 31. *Engl. Bot. t.* 2418. *Smith, Fl. Brit. p.* 1221. *Brid. Meth. p.* 69.

Bryum Celsii. *Linn.*

Dicranum intermedium. *Hedw. Sp. Musc. t.* 31. *f.* 1—6. *Brid. Meth. p.* 69.—*Dill. Musc. t.* 49. *f.* 51.

HAB. On the ground, and on moist banks.

This plant is abundant in Europe, not being uncommon in the warm parts, though seeming to prefer the colder regions. In Iceland it covers the ground in large patches, as well as in Greenland, whence Professor Geiseckè has, among other cryptogamous plants, brought beautiful specimens of this. The synonyms enumerated above can scarcely be doubted to belong to this species. It varies extremely in the length of the stems, but is very constant in the shape of its leaves, of the capsule furnished with a struma, sulcated when dry, and of its conical lid. The teeth of the peristome are so long, so narrow and deeply divided, as to demand a removal of this plant to the genus *Didymodon;* and indeed, Sir James E. Smith has, from the observations of Mr. Turner, actually described a variety of it in that section of his genus *Trichostomum* which corresponds to the *Didymodon* of Hedwig, under the name of *T. papillosum.*

2. *D. inclinatum;* leaves bifarious from a sheathing base subulate, capsule ovate inclined, lid conical. (TAB. XX.)

Didymodon inclinatum. *Swartz, Musc. Suec.—Drummond, Musc. Scot. v.* 1. *n.* 53. *Hook. Fl. Scot. P. II. p.* 135. *Arn. Disp. Musc. p.* 36.

Bryum inclinatum. *Dicks.*

Swartzia inclinata. *Hedw. St. Cr. v.* 2. *t.* 27.

Cynontodium inclinatum. *Hedw. Sp. Musc. p.* 58. *Schwaegr. Suppl. v.* 1. *p.* 111. *Funck, Deutschl. Moose, t.* 14. *n.* 1.

Cynodon inclinatus. *Brid. Meth. p.* 98.

Grimmia inclinata. *Smith, Fl. Brit. p.* 1196. *Engl. Bot. t.* 1824.

HAB. On mountain rocks, rare. On the sands of Barrie, Scotland, growing with *Weissia nigrita.—Mr. Drummond.*

The teeth of the peristome are so broad as to be remarkable in this genus, and to render it doubtful whether this moss should be arranged where Sir J. E. Smith has placed it, among his *Grimmiæ*, (the *Weissiæ* of Hedwig,) or, as we judge, taking the approximation of the teeth in pairs and the habit of the plant into consideration, whether it should be left where Swartz and Mohr have placed it, under the genus *Didymodon*. It is an extremely rare species with us, having, since the time of its discovery by Mr. Dickson, been only met with twice; first by Mr. Mackay on the mountains of Cunnamara in Ireland, and afterwards by Mr. Drummond in Scotland, in the habitat above mentioned.

* * *Capsules erect, or nearly so.*

3. *D. nervosum;* leaves obovate shortly apiculate their nerve incrassated above, capsule ovate erect, lid shortly rostrate. (TAB. XX.)

Didymodon nervosum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 66. *Arn. Disp. Musc. p.* 34.

Grimmia atro-virens. *Engl. Bot.* 2015.

HAB. On dry banks, especially in maritime situations, in the south of England.

This species may easily be mistaken for *Weissia lanceolata*, and especially for that variety which has been called *W. aciphylla* by Mohr; but the breadth and stronger texture of the leaf, its remarkable nerve, which is thickened above, and its peristome of 32 teeth approached in pairs, are abundantly characteristic marks. This species has wider leaves than those of its congeners.

4. *D. flexifolium;* stems more or less elongated, leaves oblongo-ovate flexuose strongly serrated at the point, capsule erect cylindraceous, lid rostrate. (TAB. XX.)

Didymodon flexifolium. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 66. *Hook. Fl. Scot. P. II. p.* 135. *Arn. Disp. Musc. p.* 35. *Hobson, Brit. Mosses, v.* 1. *n.* 50. *Drummond, Musc. Scot. v.* 2. *n.* 46.

Trichostemum flexifolium. *Smith, Fl. Brit. p.* 1246. *Engl. Bot. t.* 2490. *Brid. Meth. p.* 86.

Bryum flexifolium. *Dicks. Crypt. Fasc.* 3. *t.* 7.

HAB. On sterile banks near Croydon.—*Mr. Dickson.* Roof of an old barn near Manchester.—*Mr. Hobson.* Very abundant on the moor, two miles from Buxton on the Manchester road.—*Dr. Greville.* Thatch of a cottage at Bollington, Cheshire.—*Rev. H. S. Taylor.* On Ben Ledi, and mountains between Loch Earn and Loch Tay; also on the Craig-Calliach mountains, all in fructification.—*Mr. Arnott.*

Stems from half an inch long in fertile plants, to two inches in sterile ones; *leaves* rather succulent, singularly flexuose and crisped, especially at their margins, patent or recurved; their nerve disappearing below the point; the margin at the extremity remarkably serrated; *fruitstalks* about three quarters of an inch long; perichætial leaves longer than the rest, and convolute. *Capsule* ovate, cylindraceous, brown, smooth in our specimens, striated in *Engl. Bot.*; lid subulate.

We knew but little of this moss at the time when the first edition of our work was published, but it has since been found in several places, and in great perfection. Upon moory places, soon after the heath has been burned, it frequently abounds, and fructifies principally under the shade of large stones.

5. *D. glaucescens;* stems rather short densely tufted slightly branched, leaves linear-lanceolate erecto-patent acute remarkably glaucous, capsule oblong erect, lid conico-rostrate. (SUPPL. TAB. III.)

Didymodon glaucescens. *Web. et Mohr.—Grev. Scot. Crypt. Fl. t.* 127. *Arn. Disp. Musc. p.* 35.

Trichostomum glaucescens. *Hedw. St. Cr. v.* 3. *t.* 37. *Schwaegr. Suppl. v.* 1. *p.* 145. *Brid. Meth. p.* 85. *Smith, Fl. Brit. p.* 1245. *Engl. Bot. t.* 2381. *Funck, Deutschl. Moose, t.* 17. *n.* 5.

HAB. Scottish mountains.—*Mr. Dickson.* Clova mountains, growing among *Oxytropis (Astragalus) campestris,* on rocks slightly covered with earth.

This was omitted in the first edition of the *Muscologia Britannica* in consequence of our ascertaining Mr. Dickson's specimens, in Mr. Turner's Herbarium, which are referred to in

Engl. Bot., to be but plants of *Weissia striata*; and that the figure in *Engl. Bot.* is given from foreign specimens. We are still, therefore, of opinion that Mr. Drummond is the first and only discoverer of this very rare plant. In Switzerland it is, however, common upon the lofty mountains, and every where remarkable for its glaucous green hue.* The peristome is long, red, consisting of 32 filiform teeth, placed in pairs.

6. *D. Bruntoni*; stems elongated pulvinate branched, leaves lanceolato-subulate margins slightly recurved scarcely serrated twisted when dry, capsule erect ovate, lid rostrate. (SUPPL. TAB. IV.)

Didymodon Bruntoni. *Arn. Disp. Musc. p.* 36.

Dicranum Bruntoni. *Engl. Bot. t.* 2509.

Didymodon obscurum. *Kaulfuss in Sturm. Deutschl. Fl. cum. ic. Schwaegr. Suppl. v.* 2. *p.* 80. *t.* 125. *Funck, Deutschl. Moose, t.* 14. *n.* 1. *Grev. Scot. Crypt. Fl. t.* 193.

Dicranum polycarpum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 57. *Hook. Fl. Scot. P. II. p.* 133. *Hobson, Brit. Mosses, v.* 2. *n.* 36. *Drummond, Musc. Scot. v.* 2. *p.* 37.

HAB. Rocks in alpine districts, perhaps not uncommon. Pentland Hills, abundant.—*Dr. Greville.*

Habit of *Weissia crispula*, and affecting similar situations; but it is a much larger plant, with broader capsules, and less glossy foliage. It is illustrated for the first time, and extremely well, by Dr. Greville, in his admirable work, the *Scottish Cryptogamic Flora.*

7. *D. rigidulum*; leaves closely imbricated on all sides, lanceolate much acuminated carinated with the rigid nerve running beyond the point, capsule oblongo-ovate erect, lid rostrate. (TAB. XX.)

Didymodon rigidulum. *Hedw. St. Cr. v.* 3. *t.* 4. *Hook. Fl. Scot. P. II. p.* 135. *Schwaegr. Suppl. v.* 1. *p.* 116. *Brid. Meth. p.* 102. *Moug. et Nestl. t.* 612. *Arn. Disp. Musc. p.* 35.

Trichostomum rigidulum. *Smith, Fl. Brit. p.* 1238. *Engl. Bot. t.* 2178. *Turn. Musc. Hib. p.* 34.

Trichostomum lineare. *Smith, Fl. Brit. p.* 1240.? *Engl. Bot. t.* 1598. *Brid. Meth. p.* 84.

* The stems of this plant are infested with a minute filamentous parasite, bearing white powdery granules. This appearance must not be confounded with the calcareous clothing to the stems of *Weissia verticillata.*

Didymodon homomallum. *Hedw. Sp. Musc. t.* 23. *f.* 1—7. *Schwaegr. Suppl. v.* 1. *p.* 146. *Brid. Meth. p.* 102.
Grimmia homomalla. *Smith, Fl. Brit. p.* 1194. *Engl. Bot. t.* 1900.
Bryum Weissia. *Dicks. Crypt. Fasc.* 2. *p.* 5.

HAB. On the earth in mountainous situations.

We cannot avoid considering the *Didymodon homomallum* of Hedwig, Wahlenberg, and Mohr, as not specifically distinct from our *D. heteromallum*, (*Weissia heteromalla* of those authors,) although much stress has been laid on the diagnosis by the two latter. Specimens of the former, from the German botanist Ludwig, in Mr. Turner's Herbarium, have the greatest similarity with our plant, differing only in their smaller size, darker colour, and more secund leaves; nor, indeed, does the figure in Hedwig's *Species Muscorum*, (TAB. XXIII.) differ in any essential particular. Thus much for the general appearance of the two plants, their foliage and capsules. In regard to the peristome, we find both to have 16 long, filiform, occasionally perforated teeth, placed in rather distant pairs, so that their approximation is not very easily discoverable; and hence it has happened that in the figures of what is called *Weissia heteromalla* in Hedwig's Stirpes, the teeth are represented at equal distances. Wahlenberg appears to have described, under his *Weissia heteromalla*, a plant different from ours; since he says "rarissimus muscus a paucis botanicis visus;" and again, "abunde differt a *Didymonte homomallo*, foliis brevibus neutiquam arcuatis, sed tantum leviter versus unum latus spectantibus, basi vaginantibus, atque caule subfiliformi longiore;" characters which do not well accord either with our specimens or with Hedwig's figures. Our plant is remarkable for its crowded mode of growth, yellow-green leaves and pale fruitstalks; the latter becoming redder upwards, especially as the plant advances towards maturity.

Since the first edition of this work was published, we have examined specimens of this moss from Wahlenberg himself, and are more than ever confirmed in our opinion of its identity with *Weissia heteromalla*. The peristome is exactly similar in both individuals; the slight variation in the lid, noticed by authors, is assuredly not constant, and though we allow that in

Wahlenberg's specimens some difference exists in the leaves, those of *W. heteromalla* being shorter, with a broader base, thicker nerve, and less secund position, yet we possess individuals which seem exactly to unite those two appearances.

DIPLOPERISTOMI (PERISTOME DOUBLE.)

XXIII. FUNARIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double, oblique; the *outer* of 16 teeth, the *inner* of 16 teeth, opposite to those of the outer. (TAB. II.)

The genus *Funaria*, although sufficiently characterised by the interior teeth or ciliæ being oblique, and placed opposite to those of the outer, is farther remarkable by these teeth lying horizontally over the mouth of the capsule; and the mouth itself is not situated at the apex of the capsule, but a little below it, as in *Bartramia*. The capsule is obconical or pyriform, somewhat gibbous above, striated when old. The calyptra is mitriform, quadrangular in a young state, much swollen at its base, so as to be ampullaceous when old; the point mucronated. In the male flowers (of Hedwig,) the succulent filaments are remarkably clavate, jointed, pellucid, the joints containing greenish granules.

1. *F. hygrometrica;* leaves very concave ovate apiculate entire nerve excurrent, fruitstalk curved flexuose. (TAB. XX.)

Funaria hygrometrica. *Hedw. Sp. Musc. p.* 172. *Turn. Musc. Hib. p.* 105. *Smith, Fl. Brit. p.* 1338. *Engl. Bot. t.* 342. *Moug. et Nestl. n.* 132. *Funck, Deutschl. Moose, t.* 27. *n.* 1. *Hook. in Fl. Lond. ed.* 2. *(with a fig.) Hook. Fl. Scot. P. II. p.* 136. *Hobson, Brit. Mosses, v.* 1. *n.* 52. *Drummond, Musc. Scot. v.* 1. *n.* 54. *Schwaegr. Suppl. v.* 1. *P. II. p.* 75. *Brid. Meth. p.* 123. *Arn. Disp. Musc. p.* 42.

Mnium hygrometricum. *Linn. Sp. Pl. p.* 1575.—*Dill. Musc. t.* 52. *f.* 75.

HAB. On old walls and buildings, and dry and barren soils, in almost every situation.

This species has apparently well marked characters in the apiculate, not acuminate and entire leaves, and in the flexuose fruitstalk, which possesses a remarkably hygrometric quality.

2. *F. Muhlenbergii;* stems short, leaves concave ovate suddenly acuminated serrated the nerve disappearing below the point, fruitstalks straight. (TAB. XX.)

Funaria Muhlenbergii. *Turn. in Ann. of Bot. v. 2. p. 198. Smith, Engl. Bot. t. 1498. Schwaegr. Suppl. v. 1. P. II. p. 78. t. 66. Hook. Fl. Scot. P. II. p. 136. Arn. Disp. Musc. p. 42.*

HAB. In subalpine countries, principally among rocks in a calcareous soil.

3. *F. hibernica;* stems elongated, leaves plane ovato-lanceolate gradually acuminated serrated nerve disappearing below the point, fruitstalks straight. (TAB. XX.)

Funaria hibernica. *Hook. in Fl. Lond. ed. 2. (with a figure.)*

Funaria Muhlenbergii. *Mohr, Fl. Crypt. Germ. p. 380. Moug. et Nestl. n. 726. Funck, Deutschl. Moose, t. 27. n. 2.*

Funaria calcarea. *Wahl. in Act. Holm. 1806. t. 4. f. 2.?*

Funaria Muhlenbergii and F. serrata. *Brid. Meth. (according to Arnott.)*

HAB. On the roof of a thatched cottage at Blarney near Cork, Ireland.—*Mr. Drummond.*

Distinct as this species may appear at first sight from the preceding one, future observations may prove it to be the same. We are certain it is the *F. Muhlenbergii* of Mohr; and the late Dr. Swartz, who judged from the figure in *Flora Londinensis*, informs us that it is truly the *F. calcarea* of Wahlenberg, a name, which, if this suggestion is correct, it ought to bear, and if it proves, as Dr. Swartz believes that it will, a legitimate species.

From the *F. Muhlenbergii* of Turner and Schwaegrichen our plant may be known by its much longer stems and fruitstalks, its more distantly placed, longer, plane, and more gradually acuminated leaves. By its plane leaves, this moss approximates to the tropical *F. calvescens.*—Mr. Drummond of Forfar, who has paid much attention to this genus, and has cultivated plants from seed, says that these two latter species are but varieties of *F. hygrometrica.*

XXIV. ZYGODON.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth approaching in pairs; the *interior* of 8 or 16 ciliary processes lying horizontally; *Calyptra* dimidiate, smooth. (TAB. III.)

The very singular plant which forms the subject of this genus was called *Bryum* by Dickson; and by Smith *Mnium*, on account of its furrowed capsule. The form of this capsule, and its being erect, correspond well with *Orthotrichum*, with which, likewise, it has the greatest affinity in its peristome. The character which at once distinguishes this genus from *Orthotrichum* is its dimidiate calyptra, exactly as *Weissia* is discriminated from *Grimmia*, and *Didymodon* from *Trichostomum*. Three species are now known to botanists.

1. *Zygodon conoideum;* leaves acute, ciliæ eight. (TAB. XXI.)

Zygodon conoideum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 74. *Moug. et Nestl. n.* 721. *Schwaegr. Suppl. v.* 2. *t.* 136. *Hook. Fl. Scot. P. II. p.* 136. *Hobson, Brit. Mosses, v.* 1. *n.* 53. *Arn. Disp. Musc. p.* 15. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 132.

Amphidium pulvinatum. *Sturm. Deutschl. Fl. (with a figure.) Funck, Deutschl. Moose, t.* 22. *n.* 1.

Gagea compacta. *Raddi.*

Mnium conoideum. *Smith, Fl. Brit. p.* 1345. *Engl. Bot. t.* 1239.

Bryum conoideum. *Dicks. Crypt. Fasc.* 4. *t.* 11. *f.* 2. *Turn. Musc. Hib. p.* 112.

Gymnocephalus conoides. *Schwaegr. Suppl. v.* 1. *P. II. p.* 87.

HAB. Trunks of trees, near Inverary, Scotland.—*Mr. Dickson.* Pear-trees at Orange Grove, near Belfast.—*Mr. Templeton.* Trees in Glen Falloch, near Loch Lomond, and at Lorn, Scotland.—*Capt. Carmichael.* Near Manchester.—*Mr. Hobson.*

The *stems* of this moss grow in a tufted manner, like those of *Gymnostomum viridissimum*, but rarely exceed half an inch in length. *Leaves* erecto-patent, between ovate and lanceolate, plane or slightly keeled, entire; the nerve reaching to the point. Their texture is compact, dotted, exactly as in the leaves of *Gymnostomum viridissimum*. *Fruitstalk* terminal,

about as long as the stems; *capsule* ovate, erect, having a slight apophysis at the base, longitudinally striated. *Lid* rostrate. *Peristome* double; the outer consisting of 16 short, obtuse teeth approaching in pairs, which at length become recurved; inner, of as many alternating ciliæ lying horizontally over the mouth of the capsule.

Schwaegrichen at one time united this moss with *Bryum androgynum*, and formed of them a new genus, *Gymnocephalus*, from the naked male flowers which he supposed this to possess; an error into which he would not have fallen if he had known the present plant.

Since the publication of our former edition, this species has appeared in two Continental publications, under the names of *Gagea compacta*, and *Amphidium pulvinatum*. Both these plants, of which we possess authentic specimens, appear to differ at first sight from ours in the darker green, more succulent, broader and more obovate, obtuse leaves. But we find different specimens to vary even in these respects, and we are of opinion that no specific distinction exists between them. Our plants from the Isle of France, and from Dusky Bay, New Zealand, (gathered by Mr. Menzies,) accord in every particular, as far as we have been able to observe, except in their somewhat larger size; but in the specimens from New Zealand Dr. Schwaegrichen has observed 16 ciliæ, and hence has referred them to a new genus *Codonoblepharum*.

XXV. ORTHOTRICHUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* mostly double; the *exterior* of 16 teeth approaching in pairs; the *inner* of as many ciliary processes lying horizontally; *Calyptra* mitriform, sulcate, more or less hairy. (TAB. II.)

Three of the species of this genus, viz. *O. cupulatum*, *O. anomalum*, and *O. Drummondii* have no ciliary processes. *O. striatum* has them of a peculiar shape, and of a beaded ap-

pearance, arising entirely from within the range of the teeth; but, we believe, in all the remaining species the ciliary processes arise from the same membrane, and exactly from the sides of the teeth, as we have represented at *f.* 2. of the figure of the peristome in TAB. II. Notwithstanding these anomalies of the peristome, no genus of mosses is more natural in habit; and we cannot accord with Mohr, that the difference of the splitting of the base of the calyptra, in one instance in the furrow, in another in the elevation or keel, is by any means of sufficient importance to warrant the detaching of *O. crispum* from the rest of the species.

* *Peristome simple.*

† *Capsule immersed.*

1. *O. cupulatum;* leaves ovato-lanceolate erecto-patent, when dry erect straight rigid, capsule nearly sessile furrowed for its whole length, calyptra somewhat hairy afterwards quite glabrous. (TAB. XXI.)

Orthotrichum cupulatum. *Hoffm. Germ. v.* 2. *p.* 26. *Schwaegr. Suppl. v.* 1. *P. II. p.* 35. *t.* 55. *Moug. et Nestl. n.* 723. *Brid. Meth. p.* 109. *Hook. Fl. Scot. P. II. p.* 137. *Funck, Deutschl. Moose, t.* 23. *n.* 13. *Drummond, Musc. Scot. v.* 2. *n.* 51. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 112. *Arn. Disp. Musc. p.* 16.

Orthotrichum anomalum. *Smith, Fl. Brit. p.* 1267. *Engl. Bot. t.* 1423.

Orthotrichum nudum. *Smith, Fl. Brit. p.* 1268. *Engl. Bot. t.* 1325. *Dicks. Crypt. Fasc.* 4. *t.* 10. *f.* 13. *Turn. Musc. Hib. p.* 97. *Brid. Meth. p.* 111.

Orthotrichum strangulatum. *Beauv. Ætheog. p.* 51. *Schwaegr. Suppl. v.* 2. *p.* 33. *t.* 54.

HAB. Rocks and trunks of trees.

Plant of a rigid habit, dark colour, and scarcely exceeding an inch in height; the *leaves* remarkably straight, obtuse, with a strong and reddish nerve. *Capsule* deeply furrowed, and *calyptra* scarcely at all hairy.

By an examination of authentic specimens of *O. strangulatum*, we are satisfied that it is nothing more than *O. cupulatum;* and Schwaegrichen's figure of it, above quoted, differs only in its showing a slight contraction near the middle of the capsule, which is probably owing to the seeds having already escaped.

†† *Capsule exserted.*

2. *O. anomalum;* stems erect, leaves ovato-lanceolate erecto-patent straight when dry, teeth eight geminate, calyptra slightly hairy. (Tab. XXI.)

Orthotrichum anomalum. *Hedw. St. Cr. v. 2. t. 37. Turn. Musc. Hib. p. 94. Schwaegr. Suppl. v. 1. P. II. p. 37. Sturm, Deutschl. Fl. v. 4. t. 13. Moug. et Nestl. n. 29. Dicks. Crypt. Fasc. 4. p. 6. Drummond, Musc. Scot. v. 2. n. 50. Hobson, Brit. Mosses, v. 2. n. 43. Hook. Fl. Scot. P. II. p.* 137. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 119. *Arn. Disp. Musc. p.* 13.

Orthotrichum saxatile. *Brid. Meth. p.* 110.

Bryum striatum. β. *Linn. Sp. Pl. p.* 1580.—*Dill. Musc. t.* 55. *f.* 9.

Hab. Upon rocks and walls.

Stems scarcely an inch in height; *leaves* when dry, tawny brown. *Teeth* of the peristome arched when moist, inclined or erect (never recurved) when dry. Hedwig, if we may judge from his representation of the peristome, confounded this plant with *O. cupulatum;* but we see no reason for altering its name, as Bridel has done, to *O. saxatile.*

3. *O. Drummondii;* stems creeping, leaves narrow-lanceolate crisped when dry, capsule elongato-clavate deeply furrowed, calyptra very hairy. (Suppl. Tab. IV.)

Orthotrichum Drummondii. *Hook. in Grev. Crypt. Fl. t.* 115. *Drummond, Musc. Scot. v.* 1. *n.* 69. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 120.

Hab. On the trunks of young trees, especially Birches, Scotland. First discovered by *Mr. Drummond,* and since found to be abundant in the alpine glens throughout the west of Scotland.

A beautiful species, in habit much resembling specimens of *O. crispum,* but differing, even at first sight, by having the branches in the circumference of the tufts decidedly creeping, and essentially distinct by its single peristome. This peristome is large in proportion to the diameter of the capsule, of an almost pure white, composed of 16 teeth distinct at the base, but united in pairs at the extremity, spreading horizontally, or slightly deflexed. These pairs of teeth, being inserted in the furrows, their bases project so far into the mouth of the capsule as to give it a remarkably angular, or even stellated, appearance.

* * *Peristome double.*

† *Capsule immersed.*

4. *O. affine;* stems erect, leaves erecto-patent flaccid broadly lanceolate, capsule deeply furrowed, teeth of the peristome eight geminate, ciliæ filiform, calyptra slightly hairy. (Tab. XXI.)

α. majus; stems elongated; calyptra, especially above, pilose.

Orthotrichum affine. *Schrad. Spicil. p.* 67. *Smith, Fl. Brit. p.* 1263. *Engl. Bot. t.* 1323. *Turn. Musc. Hib. p.* 96. *Schwaegr. Suppl. v.* 1. *P. II. t.* 49. (under the name of *O. striatum.*) *Moug. et Nestl. n.* 323. *Sturm, Deutschl. Fl.—Funck, Deutschl. Moose, n.* 23. *f.* 5. *Hobson, Brit. Mosses, v.* 2. *n.* 45. *Hook. Fl. Scot. P. II. p.* 137. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 121. *Arn. Disp. Musc. p.* 17.—*Dill. Musc. t.* 55. *f.* 10.

Orthotrichum heterophyllum. *Beauv. Œtheog. p.* 80.?

β. pumilum; stems very short; calyptra glabrous.

Orthotrichum pumilum. *Swartz, Musc. Suec. t.* 4. *f.* 9. *Smith, Fl. Brit. p.* 1264. *Engl. Bot. t.* 2168. *Turn. Musc. Hib. p.* 98. *Schwaegr. Suppl. v.* 1. *P. II. t.* 50. *Moug. et Nestl. n.* 322. *Sturm, Deutschl. Fl.—Funck, Deutschl. Moose, t.* 23. *n.* 8. *Brid. Meth. p.* 110.

Hab. Trunks of trees and old pales, common.

We are by no means able to distinguish this species from *O. pumilum*, of which the only characters are the smaller size and entirely glabrous calyptra. Mr. Arnott considers the *O. Rogeri, Schwaegr. Suppl. v.* 1. *P. II. p.* 16. *t.* 53. to be only an obtuse-leaved variety of this plant.

5. *O. rupincola;* stems erect or procumbent, leaves suberect straight rigid broadly lanceolate, capsule furrowed above, teeth 16 patent, calyptra very hairy. (Suppl. Tab. IV.)

Orthotrichum rupincola. *Funck, Deutschl. Moose, t.* 35. *f.* 23. *Grev. Scot. Crypt. Fl. t.* 105. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 122. *Drummond, Musc. Scot. v.* 1. *n.* 57.

Hab. Rocks and stones, common; rarely upon trees, Scotland.

The characters of this moss were first discovered in this country by our friend, Mr. M. J. Stark of Glasgow. Besides its singularly rigid habit, and much larger and more luxuriant mode of growth, it may be discriminated from *O. affine* by its broader capsule, by the inner peristome being extremely deciduous, the

outer one erect, never deflexed, and by its more pilose calyptra.

6. *O. diaphanum;* stems erect (very short) leaves lanceolate acuminate diaphanous at the points, calyptra slightly hairy. (Tab. XXI.)

Orthotrichum diaphanum. *Schrad. Spicil. p.* 69. *Smith, Fl. Brit. p.* 1265. *Engl. Bot. t.* 1324. *Schwaegr. Suppl. v.* 1. *P. I. p.* 31. *t.* 55. *Moug. et Nestl. n.* 325. *Funck, Deutschl. Moose, t.* 23. *f.* 10. *Hobson, Brit. Mosses, v.* 1. *n.* 55. *Hook. Fl. Scot. P. II. p.* 137. *Arn. Disp. Musc. p.* 18. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 123. *Drummond, Musc. Scot. v.* 1. *n.* 59.

Orthotrichum aristatum. *Smith, Fl. Brit. p.* 1265. *Turn. Musc. Hib. p.* 100. *t.* 9. *f.* 2.

Hab. Trees, walls, roofs, and old pales, especially near the sea.

An extremely common species, distinguished readily enough by the diaphanous points of the leaves. The teeth are 16, not approximated in pairs.

7. *O. rivulare;* stems procumbent, leaves broadly lanceolate obtuse, ciliæ setaceous, calyptra glabrous. (Tab. XXI.)

Orthotrichum rivulare. *Smith, Fl. Brit. p.* 1266. *Turn. Musc. Hib. p.* 96. *t.* 8. *Engl. Bot. t.* 2188. *Hobson, Brit. Mosses, v.* 2. *n.* 46. *Hook. Fl. Scot. P. II. p.* 137. *Drummond, Musc. Scot. v.* 2. *n.* 56. *Arn. Disp. Musc. p.* 18. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 123. *Schwaegr. Suppl. v.* 1. *P. II. p.* 31. *Brid. Meth. p.* 111.

Hab. Rocks and streams.

Two or three inches long, vieing with *O. striatum* in size, of a very dark lurid green, leaves very obtuse; ciliæ extremely narrow, and arising from the sides of the teeth. This moss appears to be unknown to the Continental Muscologists, though found in various parts of our own country.

8. *O. striatum;* stems erect, leaves lanceolate patent straight when dry, capsule ovate smooth, ciliæ torulose, calyptra slightly hairy. (Tab. XXI.)

Orthotrichum striatum. *Hedw. St. Cr. v.* 2. *t.* 3. *f.* 9.? *Smith, Fl. Brit. p.* 1263. *Engl. Bot. t.* 2187. *Turn. Musc. Hib. p.* 95. *(excl. var. β.) Moug. et Nestl. n.* 324. *Funck, Deutschl. Moose, t.* 23. *f.* 11. *Hook. Fl. Scot. P. II. p.* 137. *Hobson, Brit. Mosses, v.* 1. *n.* 56. *Drummond, Musc. Scot. v.* 1. *n.* 56. *Arn. Disp. Musc. p.* 18. *Schwaegr. Suppl. v.* 1. *P. II. p.* 29. *t.* 54. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 123. *Brid. Meth. p.* 111.

HAB. Trunks of trees.

The stems vary considerably in length, from one to three inches; and are only exceeded by those of *O. Lyellii*. The inner peristome is of a very peculiar structure, broad, pale-coloured, and composed of moniliform joints, usually arranged in single rows, but not unfrequently having other joints attached to their sides. Moreover, the ciliæ do not arise from the sides of the exterior teeth, as in most other European species of *Orthotrichum*, but originate below their sinus, and from a different and an interior membrane, as in *Hypnum*.

9. *O. Lyellii;* stems erect (elongated,) leaves linear-lanceolate subundulate carinated very acute crisped when dry, capsule oblong furrowed, ciliæ filiform, calyptra very hairy. (TAB. XXII.)

Orthotrichum Lyellii. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 76. *Moug. et Nestl. n.* 619. *Hobson, Musc. Brit. v.* 2. *n.* 47. *Hook. Fl. Scot. P. II. p.* 137. *Arn. Disp. Musc. p.* 18. *Drummond, Musc. Scot. v.* 2. *n.* 57. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 124.

HAB. On trees in the New Forest, Hants.—*Mr. Lyell.* About Oxford.—*Mr. Oglander.* Common in similar situations in Scotland.

This fine species, to which we have given the name of its estimable discoverer, has many points in common with *O. striatum;* and yet is, at first sight even, so easily distinguished by its long, narrow, and crisped leaves, and sessile fruit, that we think no one will hesitate in pronouncing it as decidedly marked a species as any in the genus. It has been found in North America by Mr. Menzies, and has been published in Germany by Mougeot and Nestler. Mr. Arnott has gathered it in the forest of Montmorency near Paris.

The *stems* are from two to three and even four inches in length, and are certainly among the largest of the genus, much branched; with the branches, when growing on the trunks of trees, turned upwards in a dry state, as in *Leucodon sciuroides*. Below they are destitute of foliage, in consequence of the plant growing in a crowded manner; above densely clothed with long, linear-lanceolate, recurvo-patent, undulate, and when dry, crisped leaves, whose margins are not, (as in almost all the other species,) recurved, but rather have a tendency to be in-

curved. Their colour is a deep yellowish green. On various parts of their surface the *Conferva Orthotrichi* grows in abundance, so that they appear strewed with a brown powdery substance. The *fruitstalks* are short, wholly immersed in the leaves, as are the capsules for a great portion of their length. These are of an oblong figure, with a remarkably long apophysis, which is smooth and shrinks much in drying; while the capsule itself is at all times, when ripe, distinctly furrowed; whereas in *O. striatum* it is ovate, and always smooth. *Lid* shortly rostrate. *Peristome*, the exterior of 16 long teeth, standing erect when moist, recurved when dry; they are marked with a central line, and are often cleft at the extremity. Their colour is a pale yellowish brown; that of the inner fringe or ciliæ is a fine red, they are 16 in number, slightly tapering, and decidedly jointed, but not so moniliform as in the preceding, nor have we ever seen lateral appendages to the joints. *Calyptra* very hairy, narrower than in *O. striatum*, and all over of the same brown colour.

We are by no means sure that Hedwig, in the figure of the capsule of his *O. striatum* in the *Stirpes*, has not given that of this species, with which it certainly agrees in the situation, apophysis, and, in a great measure, in the shape of the ciliary processes. These, however, are represented too moniliform for our plant, yet not enough so for those of *O. striatum*; and the colour is that of the last mentioned.

† *Capsule exserted.*

+ *Ciliæ eight.*

10. *O. speciosum*; stems erect, leaves ovato-lanceolate acuminate patent scarcely recurved at the margins and point, capsule slightly furrowed, teeth of the peristome eight afterwards 16 reflexed, calyptra hairy. (SUPPL. TAB. IV.)

Orthotrichum speciosum. *Nees et Esenb. in Sturm, Deutschl. Fl.? Moug. et Nestl. n.* 72. *Funck, Deutschl. Moose, t.* 34. *f.* 23. *Drummond, Musc. Scot. v.* 2. *n.* 55. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 124. *Grev. Scot. Crypt. Fl. t.* 137. *Arn. Disp. Musc. p.* 18.

Orthotrichum striatum. *Hedw. St. Cr. v.* 2. *t.* 36. *f.* 1—3.

HAB. Near Montrose, Scotland; first discovered by *Mr. Reid.*

On trees and stones near Forfar.—*Mr. Drummond.*

The present plant agrees perfectly with the description of Funck above quoted, and equally with his specimen, except that in the latter the capsule can scarcely be termed exserted, whereas in this individual it is decidedly so. The figure of Nees, in Sturm's Flora, has likewise its capsule subimmersed and perfectly smooth; in which respect it agrees with a North American species, *O. elegans*. In this individual the teeth are eight in number, geminate, soon becoming reflexed and splitting into 16, which are approximated in pairs. In some arctic specimens of this moss, we find the capsules to be nearly as much exserted as in *O. anomalum;* a character, which, with the different conformation of its teeth, serves to discriminate this from *O. affine*. The colour of the foliage is reddish-brown, resembling that of many tropical species.

The figures above quoted of Hedwig, excluding *f.* 9. are so admirably characteristic of this species, that we have no hesitation in referring them to it.

11. *O. Hutchinsiæ;* stems erect, leaves lanceolate erect rigid, capsule clavate furrowed, calyptra very hairy. (Tab. XXI.)

Orthotrichum Hutchinsiæ. *Smith, Engl. Bot. t.* 2523. *Hobson, Brit. Mosses, v.* 2. *n.* 44. *Hook. Fl. Scot. P. II. p.* 137. *Funck, Deutschl. Moose, t,* 23. *n.* 3. *Moug. et Nestl. n.* 618. *Schwaegr. Suppl. v.* 2. *P. II. p.* 138. *Drummond, Musc. Scot. v.* 2. *n.* 53. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 125. *Arn. Disp. Musc. p.* 18.

Orthotrichum americanum. *Beauv.—Schwaegr. Suppl. v.* 2. *P. II. t.* 138. *(according to Arnott.)*

Hab. First discovered in Ireland, by the sides of lakes, near Bantry.—*Miss Hutchins.* Also in the county of Wicklow. Banks of the Plyme, Devonshire.—*Rev. J. S. Tozer.* In various parts of Scotland.—*Greville and Hooker.*

The present species, though it has the capsule, calyptra, and very nearly the peristome of *O. crispum*, yet differs essentially from it in the leaves, which bear a close resemblance to those of *O. anomalum*, are of the same brownish colour, and nearly as erect when dry as when in a moist state. The fruitstalks, which are quite as much exserted as those of *O. crispum*, are often twisted. The peristome only differs from that of the last mentioned species by its having the eight teeth (when recurved,)

deeply and regularly cleft down the middle. *O. aureum* of Mart. *Fl. Crypt. Erlang. p.* 77. *t.* 2. is but a green variety of this plant with more flaccid leaves.

12. *O. Ludwigii*; stems creeping, leaves erecto-patent narrowly lanceolate crisped when dry, capsule pyriform smooth furrowed only at the extremity, mouth extremely contracted, calyptra remarkably hairy. (SUPPL. TAB. IV.)

Orthotrichum Ludwigii. *Brid. Musc. Suppl. p.* 26. *Schwaegr. Suppl. v.* 1. *P. II. p.* 24. *t.* 51. *Moug. et Nestl. n.* 617. *Sturm, Deutschl. Fl. ic.? Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 125. *Drummond, Musc. Scot. v.* 2. *n.* 52. *Arn. Disp. Musc. p.* 18. *Grev. Scot. Crypt. Fl. t.* 133.

Orthotrichum clausum. *Hornsch. MSS.?*

Ulota Ludwigii. *Brid. Meth. p.* 112.

Splachnum Wulfenianum. *Schwaegr. Suppl. v.* 1. *P. I. p.* 46. *t.* 14.

HAB. Hill of Finhaven, five miles east of Forfar, Scotland; on Beech-trees, rare.—*Mr. Drummond.* Abundant upon young oaks in subalpine glens in various parts of Scotland.

The foliage and ramification of this species very much resemble those of *O. Drummondii*, and the two mosses are frequently, at least in this country, found mingled into one tuft. The capsule of *O. Ludwigii* differs, however, essentially, not only from that of its congener, but from that of every species of *Orthotrichum* with which we are acquainted. It is exactly pyriform, of a very pale hue, smooth, furrowed only at the very extremity, and at the mouth so remarkably contracted, as when dry, to leave no perforation at all, the base of the teeth literally meeting together. This species, we have every reason to believe, has been passed over for *O. crispum*, in consequence of the similarity of its place of growth, and its crisped leaves. The capsule, however, is totally dissimilar, and the leaves are not more crisped than those of *O. Drummondii*.

It was not before we had examined very numerous specimens of this plant, both natives of the continent and of our own country, that we were enabled to ascertain the presence of an inner peristome. It is composed of eight exceedingly slender ciliæ, arising from the sides of the teeth, and, from their highly delicate nature, they are extremely fugacious. They are

formed of a single row of elongated cellules. We may here observe, that Drs. Mougeot and Nestler, who published in their *Stirpes* a plant which they consider *O. Ludwigii*, afterwards on ascertaining that it had no internal peristome, referred it to *O. clausum* of Hornschuch's MSS. We have quoted the latter plant, with a mark of doubt, though we cannot help believing, from our own experience, that the plant of Mougeot and Hornschuch is the same as ours, agreeing with it in every respect, save in the alleged absence of an inner peristome.

We have quoted, also dubiously, the figure of Sturm, as it by no means agrees with any of our specimens, whether foreign or British; the magnified capsule being of a different form and deeply furrowed. It is also our opinion that the *Splachnum Wulfenianum*, figured in Schwaegrichen's *Suppl.* is nothing but an injured specimen of this *Orthotrichum*, as it very much resembles it in the leaves, capsule, and peristome.

13. *O. crispum;* stems erect, leaves lanceolato-subulate much crisped when dry, capsule oblongo-clavate furrowed, teeth of the peristome eight geminate patent reflexed, calyptra very hairy. (Tab. XXI.)

Orthotrichum crispum. *Hedw. St. Cr. v.* 2. *t.* 35. *Sp. Musc. t.* 162. *Schwaegr. Suppl. v.* 1. *P. II. p.* 23. *Smith, Fl. Brit. p.* 1266. *Engl. Bot. t.* 996. *Moug. et Nestl. n.* 30. *Sturm, Deutschl. Fl. Funck, Deutschl. Moose, t.* 23. *f.* 1. *Hook. Fl. Scot. P. II. p.* 137. *Hobson, Brit. Mosses, v.* 1. *n.* 54. *Drummond, Musc. Scot. v.* 1. *n.* 58. *Arn. Disp. Musc. p.* 18. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 126.

Ulota crispa. *Mohr.—Brid. Meth. p.* 112.

Orthotrichum curvifolium. *Wahl. Lapp. p.* 365.?

Hab. Abundant on trees; rarely found upon walls and stones.

This can scarcely be confounded with any British species, having striking characters in its large size, very crisped foliage, and exserted fruitstalks. The stems form dense, prominent tufts, conspicuous from their rich yellowish, or reddish green colour. The sterile plants have sometimes a creeping habit; leaves exceedingly crisped, fruitstalks long and very numerous. As far as we can judge from the imperfect specimens which we possess of *O. curvifolium*, it appears in no respect to differ from *O. crispum*.

+ + *Ciliæ sixteen.*

14. *O. pulchellum;* stems creeping (short,) leaves narrowly lanceolate crisped when dry, teeth of the peristome 16 approaching in pairs patent (red), calyptra almost smooth plicate at the base. (Tab. XXI.)

Orthotrichum pulchellum. *Engl. Bot. t.* 1787. *Hobson, Brit. Mosses, v.* 1. *n.* 57. *Hook. Fl. Scot. P. II. p.* 137. *Drummond, Musc. Scot. v.* 1. *n.* 55. *Hook. and Grev. in Edin. Journ. of Science, v.* 1. *p.* 127. *Arn. Disp. Musc. p.* 18.

Hab. On trunks of trees.

This species, which seems unknown on the continent, was first distinguished by the late Mr. Brunton, who found it in the north of England. We have collected specimens on the mountains near Dublin, and Mr. Hobson has met with it near Manchester. The stems are from half an inch to an inch long; leaves of a bright green colour; outer peristome of a fine red colour, spreading. Calyptra beautifully plicate at the base, the plicæ coloured at their extremity.

XXVI. NECKERA.

Gen. Char. *Fruitstalks* lateral; *Peristome* double; the *outer* of 16 teeth, the *inner* of 16 ciliæ, connected only at the very base by a short membrane; *Calyptra* dimidiate. (Tab. III.)

A careful dissection of the inner fringe of any of the species included under this genus will exhibit a peristome very closely resembling that of *Leskea* of Hedwig, to which, indeed, it must be confessed that *Neckera* is too nearly allied, differing only in having the membrane which unites the ciliæ at the base so short, as scarcely to rise at all above the mouth of the capsule. The same reasons which induce us to unite *Leskea* with *Hypnum* should have prevailed with us to add to them *Neckera* also, if it were not a genus so universally adopted that we do not know of

any Muscologist who has not kept it distinct. The habit of the British species approaches very nearly to that of *Hypnum trichomanoides*, and *H. complanatum*. Like them, the leaves are bifarious and distichous.

1. *N. pumila;* leaves bifarious ovato-acuminate slightly concave their margins recurved, fruitstalks scarcely longer than the perichætial leaves, capsule oblongo-ovate. (TAB. XXII.)

   Neckera pumila. *Hedw. St. Cr. v. 3. t. 20, Smith, Fl. Brit. p. 1272. Engl. Bot. t. 1443. Brid. Meth. p. 137. Moug. et Nestl. n. 429. Schwaegr. Suppl. v. 1. P. II. p. 147. Hook. Fl. Scot. P. II. p. 138. Arn. Disp. Musc. p. 52.*

   Hypnum pennatum. *Dicks.*

   Fontinalis pennata. *Huds.*

   HAB. Woods in Sussex. Very abundant in the New Forest, Hants. At Inverary and Cliesh, plentiful, but generally speaking, rare in Scotland.

   This plant, which is always found upon trees, has been, till lately, supposed peculiar to the British Isles; but it has now been discovered in France, in Switzerland, and Lapland. As to size, it is but one third so large as *N. crispa*, and much branched in a pinnated manner, and so strongly resembling *Hypnum complanatum*, that we have received this latter moss with the name of our *Neckera* from various correspondents. The leaves, however, under a microscope, will be found of a different figure, and they are slightly undulate, especially when dry. The perichætial leaves are long, very convolute, ovate, much acuminated, and the fruitstalks are but in a slight degree exserted beyond them. The capsules are ovate, a little inclining to cylindrical. *Neckera pennata*, which, though extremely scarce in Britain, is much more abundant on the Continent than *N. pumila*, may be discriminated by its larger size, longer and more plane leaves, and above all, by its nearly sessile, and wholly immersed capsules.

2. *N. pennata;* leaves bifarious ovato-lanceolate acuminate plane, fruitstalk none, capsule oblong immersed in the perichætial leaves. (SUPPL. TAB. IV.)

   Neckera pennata. *Hedw. St. Cr. v. 3. t. 19. Schwaegr. Suppl. v. 1. P. II. p. 144. Moug. et Nestl. n. 146. Funck, Deutschl. Moose, t.*

34. *n.* 1. *Hook. Fl. Scot. ed.* 2. *ined. Grev. Scot. Crypt. Fl. t.* 109. *Brid. Meth. p.* 137.

Daltonia pennata. *Arn. Disp. Musc. p.* 54.

Fontinalis pennata. *Linn. Sp. Pl. p.* 1571.—*Dill. Musc. t.* 32. *f.* 9.

HAB. On the lower part of the trunk of a Beech-tree at Fotheringham, four miles south of Forfar, Scotland. Very rare, only a small patch found in fructification.—*Mr. Drummond.*

This moss is not uncommon in Switzerland, where we have gathered it abundantly, and whence Dillenius received it; but in Britain it was unknown till lately, when it was found by Mr. Drummond, though only in one spot, and there very sparingly. It is intermediate, as to size, between *N. pumila*, and *N. crispa*, and may, besides, be readily distinguished from both those species by the different form of its leaves and immersed capsule.

3. *N. crispa;* leaves bifarious oblong acuminulate transversely rugose, fruitstalk much exserted, capsule ovate. (TAB. XXII.)

Neckera crispa. *Hedw. Sp. Musc. p.* 206. *Turn. Musc. Hib. p.* 101. *Smith, Fl. Brit. p.* 1273. *Moug. et Nestl. n.* 429. *Hobson, Brit. Mosses, v.* 2. *n.* 48. *Hook. Fl. Scot. P. II. p.* 138. *Funck, Deutschl. Moose, t.* 34. *f.* 2. *Drummond, Musc. Scot. v.* 1. *n.* 61. *Brid. Meth. p.* 137. *Arn. Disp. Musc. p.* 52. *Schwaegr. Suppl. v.* 1. *P. II p.* 147.

Hypnum crispum. *Linn.—Engl. Bot. t.* 617.—*Dill. Musc. t.* 36. *f.* 12.

HAB. On trees and rocks in subalpine countries, especially in a calcareous soil.

Scarcely any moss can exceed the present in beauty. Its size, being often from six to eight inches in length, its regularly pinnated branches, its large, shining, and crisped leaves, give it more the appearance of some of the fine tropical mosses, than of those of our own country, where it is far from uncommon in the mountainous districts, and frequently covers a great extent of surface upon the trunks of old forest-trees. In this, as well as the preceding species, the extremity of the leaves is, under a magnifying power, slightly serrated. The present has the fruitstalks much exserted, in which it differs strikingly from *N. pumila*, as well as from *N. pennata;* and the capsule is ovate, approaching to spherical.

XXVII. ANOMODON.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double, consisting of 16 teeth, and a ciliary process arising from each tooth; *Calyptra* dimidiate. (TAB. III.)

Whilst the true *Neckeræ* have the ciliary processes arising from an internal membrane, as in the *Leskeæ* of Hedwig, the two British species, now included under the present genus, cannot correctly be said to have any internal peristome; the narrow processes, corresponding to those of double fringed mosses, arising from the very same range, and by the sides of the teeth, as is the case with most of the *Orthotricha*. Since, however, the species which compose the genus in question have nothing in their habit in common with the genus *Neckera*, with which they have been hitherto united, the argument for keeping together the anomalous species of *Orthotrichum* will not hold good in the present instance; and we have thought it right to bring the two following plants into a genus, which we have called *Anomodon*.

1. *A. curtipendulum;* leaves ovate acuminate toothed the nerve disappearing below the point, fruitstalk twice as long as the perichætium, capsule ovate. (TAB. XXII.)

Anomodon curtipendulum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 79. *Hobson, Brit. Mosses, v.* 2. *n.* 49. *Hook. Fl. Scot. P. II. p.* 138. *Drummond, Musc. Scot. v.* 1. *n.* 62.

Neckera curtipendula. *Hedw. Sp. Musc. p.* 209. *Turn. Musc. Hib. p.* 102. *Smith, Fl. Brit. p.* 1275. *Engl. Bot. t.* 1444. *Moug. et Nestl. n.* 47. *Funck, Deutschl. Moose, t.* 34. *f.* 5. *Arn. Disp. Musc. p.* 53. *Schwaegr. Suppl. v.* 1. *P. II. p.* 151.

Antitrichia curtipendula. *Brid. Meth. p.* 36.

Hypnum curtipendulum. *Linn.—Dill. Musc. t.* 43. *f.* 69.

HAB. Upon the ground, and on rocks and trees. Abundant in mountainous countries; rare in the plains; the only station we are acquainted with in the eastern angle of the kingdom, is on the sandy plains near Yarmouth; but it is there always barren.

There is something very peculiar in the dark, almost blackish green, long, cylindrical, and straggling, though somewhat pin-

nate stems of this plant. On the wilds of Dartmoor we have gathered them eight or ten inches long, and in a fine state of fructification. The extremities of the branches are slightly incrassated; leaves imbricated on every side, concave, with a reflexed margin. Those of the perichætium are very convolute, almost cuspidate, nerve short.

2. *A. viticulosum;* leaves ovato-lanceolate obtuse entire the nerve reaching to the point, fruitstalks very long, capsule cylindrical. (TAB. XXII.)

Anomodon viticulosum. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 80. *Hook. Fl. Scot. P. II. p.* 138. *Hobson, Brit. Mosses, v.* 2. *n.* 50. *Drummond, Musc. Scot. v.* 1. *n.* 63. *Arn. Disp. Musc. p.* 53. *Schwaegr. Suppl. v.* 1. *P. II. p.* 149.

Neckera viticulosa. *Hedw. Sp. Musc. t.* 48. *f.* 4—8. *Turn. Musc. Hib. p.* 103. *Moug. et Nestl. n.* 237. *Funck, Deutschl. Moose, t.* 34. *f.* 4. *Brid. Meth. p.* 138.

Hypnum viticulosum. *Linn. Sp. Pl. p.* 1592. *Smith, Fl. Brit. p.* 1275. *Engl. Bot. t.* 265.—*Dill. Musc. t.* 39. *f.* 43.

HAB. Upon trees and rocks; less frequently on the ground.

Stems creeping; branches erect, numerous. Leaves imbricated on all sides of the stem, erect, patent, somewhat undulate, of a thick and soft texture, of a pale green colour, very yellow when old. Perichætium small; its leaves narrower, and more concave than the rest; nerve strong. Fruitstalks an inch or more in length. Capsule cylindrical; lid rostrate.

XXVIII. DALTONIA.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double, consisting of 16 teeth, with a ciliary process arising from the side of each; *Calyptra* mitriform. (TAB. III.)

The mitriform calyptra separates this new genus from the preceding, with which the peristome well accords, so that they bear the same relation to each other as *Hookeria* does to *Hypnum*. With much pleasure we here offer our tribute of affectionate re-

gard to our valued friend the Rev. James Dalton, by whose muscological communications we have frequently profited during the collection of the materials for the present volume.

1. *D. splachnoides;* leaves oblongo-lanceolate, fruitstalks long, calyptra fimbriated at the base. (TAB. XXII.)

Daltonia splachnoides. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 80. *Arn. Disp. Müll. p.* 54.

Neckera splachnoides. *Engl. Bot. t.* 2564. *(not of Schwaegr.)*

HAB. Secawn mountain, near Dublin.—*Dr. Taylor.*

This curious moss has hitherto only been found in the spot above mentioned, by the side of a streamlet, where it grows sparingly, in small, pale, green tufts. The stems are scarcely more than a quarter of an inch in height, slightly branched, branches erect. Leaves rather loosely imbricated, almost erect, of a delicate, nearly membranaceous, structure, faintly reticulated, the margins recurved and somewhat undulate, entire; the nerve reaching almost to the point; those of the perichætium are few, small, ovate, concave, nerveless. Fruitstalk lateral, about as tall as the stems. Capsule turbinate, with a small apophysis, which gives it the appearance of that of a *Splachnum*, whence the specific name. Calyptra mitriform, with a small cuspidate point; its colour is nearly white, its texture delicate, faintly reticulated; its base cut into a number of fine capillary segments resembling those of *Dicranum flexuosum*. Lid conico-rostrate, about as long as the capsule. Peristome large, the teeth pointing in various directions; the exterior ones reddish brown, the interior pale yellow.

The plant to which of all others, this doubtless bears the closest affinity, is the *Neckera splachnoides* of Schwaegrichen's *Suppl. t.* 82. (*Orthotrichum splachnoides* of Bridel;) but that has altogether the peristome of an *Orthotrichum*, having the exterior teeth double, and a dimidiate calyptra.

2. *D. heteromalla;* leaves broadly ovate acute, capsule sessile immersed, calyptra nearly entire. (TAB. XXII.)

Daltonia heteromalla. *Hooker and Tayl. Musc. Brit. ed.* 1. *p.* 81. *Hook. Fl. Scot. ed.* 2. *(ined.) Hobson, Musc. Brit. v.* 2. *n.* 51. *Drummond, Musc. Scot. v.* 1. *n.* 64. *Arn. Disp. Musc. p.* 55.

Neckera heteromalla. *Hedw. St. Cr. v.* 3. *t.* 15. *Turn. Musc. Hib. p.* 102. *Smith, Fl. Brit. p.* 1274. *Engl. Bot. t.* 1180. *Funck,*

Deutschl. Moose, t. 34. *f.* 3. *Schwaegr. Suppl. v.* 1. *P. II. p.* 146.

Cryphæa heteromalla. *Brid. Meth. p.* 139.

Fontinalis secunda. *Dicks.*

Sphagnum arboreum. *Linn. Sp. Pl. p.* 1570.—*Dill. Musc. t.* 32. *f.* 6.

HAB. Trunks of trees; rare in Scotland. Trees near Forfar and near Callander.

Stems slightly branched, diffuse. Leaves imbricated on every side, concave, with the nerve disappearing below the point, their margins recurved, quite entire. Perichætial leaves as long as the capsule, broadly ovate, and suddenly acuminated, almost cuspidate, having a nerve reaching to the point. Capsule sessile. Lid conico-acuminate. Calyptra mitriform, brown, somewhat fringed at the margin.

XXIX. FONTINALIS.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double; the *exterior* consisting of 16 teeth; the *inner* of 16 ciliæ, connected by transverse bars, and forming a reticulated cone; *Calyptra* mitriform. (TAB. III.)

We know of no genus which at all resembles this in the curious structure of its inner peristome. We speak, however, only of the two first of the following species; for of the third we can say nothing, having never seen its peristome. Its habit and strongly-nerved leaves differ essentially from the two others.

1. *F. antipyretica;* leaves nerveless for the most part complicato-carinate. (TAB. XXII.)

Fontinalis antipyretica. *Linn. Sp. Pl. p.* 1571. *Turn. Musc. Hib. p.* 199. *Smith, Fl. Brit. p.* 1336. *Engl. Bot. t.* 859. *Moug. et Nestl. n.* 238. *Hook. Fl. Scot. P. II. p.* 138. *Funck, Deutschl. Moose, t.* 54. A. *f.* 1. *Hobson, Brit. Mosses, v.* 1. *n.* 59. *Drummond, Musc. Scot. v.* 2. *n.* 59. *Arn. Disp. Musc. p.* 70. *Schwaegr. Suppl. v.* 1. *P. II. p.* 307.—*Dill. Musc. t.* 33. *f.* 1.

HAB. Rivers and stagnant waters; abundant on wood by river banks.

Stems often a foot in length, fluitant. Leaves generally broadly ovate, and trifarious, acute, quite entire, not always complicato-carinate; and we have sometimes seen them so plane, and so narrow, that it has been scarcely possible to distinguish them from those of *F. squamosa*. Fruit lateral, principally from the lower part of the stems. Perichætium large; its leaves resembling closely imbricated scales; they are of a roundish form, concave, nerveless, frequently erose at their apices from the action of the water. Capsule elliptic; lid conico-acute.

The specific name was given to this plant in allusion to its being employed by the Swedes to fill up the spaces between the chimney and the walls, and thus, by excluding the air, prevent the action of the fire.

2. *F. squamosa;* leaves nerveless plane or very slightly concave. (TAB. XXII.)

Fontinalis squamosa. *Linn. Sp. Pl. p.* 1571. *Hedw. St. Cr. v.* 3. *t.* 12. *Turn. Musc. Hib. p.* 199. *Smith, Fl. Brit. p.* 1336. *Engl. Bot. t.* 1861. *Funck, Deutschl. Moose, t.* 54. A. *f.* 1. *Hook. Fl. Scot. P. II. p.* 139. *Hobson, Brit. Mosses, v.* 2. *n.* 52. *Drummond, Musc. Scot. v.* 2. *n.* 60. *Arn. Disp. Musc. p.* 70.

HAB. In alpine rivulets of England, Wales, and Scotland, abundant.

This is not an uncommon moss; though it has been considered rare, owing to the similarity it bears to small varieties of the preceding species. Indeed, its distinctness as a species is doubtful, for in general the individuals possess both complicato-carinate, and nearly plane leaves; thus rendering it doubtful to what species they belong. Judging from the breadth of the leaves in the *English Botany* figure, we think that even that representation may be taken from specimens of *F. antipyretica;* and we are certain that all the plants we have received from Ireland under the name of *F. squamosa* have been nothing more. Fruit, though smaller, similar to that of *F. antipyretica.*

We have never seen *F. antipyretica* otherwise than in stagnant waters, or those which have a slow motion, whilst *F. squamosa* we have constantly found in mountain streams,

where the motion of the water was rapid. In Lough Bray, in Ireland, *F. antipyretica* only is found, and in the stream which issues from it and tumbles down the steep side of the mountain, only *F. squamosa*, yet they both bear fructification.

3. *F. capillacea;* leaves furnished with a nerve slightly concave. (Tab. XXII.)

Fontinalis capillacea. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 1. *Smith, Fl. Brit. p.* 1337. *Engl. Bot. t.* 2432. *Schwaegr. Suppl. v.* 1. *P. II. p.* 307. *Brid. Meth. p.* 186. *Arn. Disp. Musc. p.* 70.—*Dill. Musc. t.* 33. *f.* 5. *Hook. Fl. Scot. P. II. p.* 139.

Hab. Alpine rivulets.—*Mr. Dickson.*

With this species we are but little acquainted, having only seen it in Mr. Turner's rich Herbarium, and, like the last described, communicated by our great cryptogamist, Mr. Dickson. In the specimens there preserved, the stems are from two to three inches long, but evidently broken, so that they can give no just idea of the length, which Dillenius represents as a span or more, branched. The leaves are subsecund, especially towards the extremity of the branches, of a brownish green colour, long-subulate, concave, or a little carinate, furnished with a strong nerve. Perichætium half an inch in length, lateral, arising from the lower part of the stem or branches; its leaves very long and sheathing. No fructification in a more advanced state has been found on Mr. Dickson's Scotch specimens; but Dillenius, whose Pennsylvanian plants, above referred to, are considered to be the same, thus describes the perichætia and capsules:—"e foliorum alis, præsertim qua rami egrediuntur, calyces enascuntur longi, styli instar porrecti, ab initio convoluti et cuspidati, postea in squamas membranaceas oblongas latiusculas pellucidas in summitate dehiscentes, e quibus capsulæ prominent exiguæ, oblongo-rotundæ, operculo cuspidato terminatæ, virides, per maturitatem subfuscæ, exilibus ciliis coronatæ, setis e calyce vix prominulis, per vaginam tamen seu calycem ad basin usque pertingentibus."

Dillenius compares his fine specimens to *Hedwigia aquatica*. Dickson's specimens are much smaller and slenderer, and we sometimes think that that author may have gathered large aquatic specimens of *Weissia acuta* without fructification, and

mixed them with Exotic specimens of the real plant; thus confounding the two. We know, at least, that in such a state *W. acuta* has much the appearance of the Dillenian *F. capillacea.*

XXX. BUXBAUMIA.

GEN. CHAR. *Capsule* oblique, gibbous; *Peristome* double; the *exterior* of numerous filiform, jointless processes; the *interior* a plicate membranous cone; *Calyptra* mitriform. (TAB. III.)

The only species of this genus has truly a double peristome; but its exterior is totally different from that of any other moss. The processes are slightly torulose, but not jointed, of a reddish brown colour, and of so peculiar a nature that they do not absorb water even when immersed in it for a considerable length of time. For a more full history of this genus, we must refer our readers to the Sixth Number of the New Series of the *Flora Londinensis.*

1. *B. aphylla.* (TAB. XXII.)

Buxbaumia aphylla. *Linn. Sp. Pl. p.* 1570. *Smith, Fl. Brit. p.* 1148. *Engl. Bot. t.* 1596. *Hook. in Fl. Lond. ed.* 2. *(with a figure.) Moug. et Nestl. n.* 38. *Funck, Deutschl. Moose, t.* 24. *f.* 1. *Hook. Fl. Scot. P. II. p.* 139. *Arn. Disp. Musc. p.* 12. *Schwaegr. Suppl. v.* 1. *P. II. p.* 65. *Brid. Meth. p.* 123.

Buxbaumia viridis. *Moug. et Nestl. n.* 724.

HAB. In a fir wood at Sprowston near Norwich. Near Rosslyn.—*Mr. E. Maugham.* Wood near Aberdeen.—*Mr. Jackson.* Selkirkshire, near the borders of Peebleshire.—*Mr. J. Stewart.* Georgetown Hill, near Kinross.—*Mr. Arnott.*

This most singular of mosses can scarcely be said to have any stems. All that can be called a stem, (or perhaps more strictly, a perichætium,) resembles a small bulb covered with hair-like processes, but which, when highly magnified, are found, by Mr. Brown, to be *true leaves*, membranous, reticulated, laciniated, and so narrow and minute, that they were either entirely overlooked or described only as hairs by preceding authors. The fruitstalks, which are about an inch high,

red, and rough with tubercles, arise from this small bulb, or perichætium, which strikes immediately into the earth its brown entangled roots. Upon the summit of the fruitstalk, between it and the capsule, is a short cylindrical apophysis, much narrower than the capsule and somewhat wider than the fruitstalk. Capsule large, ovate, oblique, flattish above, below convex, at the base gibbous; the mouth has an elevated rim or margin, which is irregularly cleft. The whole is of a greenish colour, varied with brown, and almost a deep red brown when quite ripe; lid obtusely conical; calyptra of the same shape, but more acuminated.

XXXI. BARTRAMIA.

GEN. CHAR. *Fruitstalks* terminal; *Capsule* subglobose; *Peristome* double; the *exterior* of 16 teeth; the *inner* of a membrane divided into 16 bifid segments; *Calyptra* dimidiate. (TAB. III.)

Between the division of the segments of the inner peristome, short filiform processes may be observed in all the species of this genus, except *B. arcuata*. *Bartramia* approaches very nearly to *Bryum*, but has, in almost every case, a spherical capsule; and the 16 broad segments of the inner peristome, instead of being entire, or only perforated, are cleft like the teeth of a *Dicranum*.

* *Fruitstalks long, straight, (not curved.)*

1. *B. pomiformis;* leaves patent subulate strongly serrated the nerve reaching to the summit, twisted when dry. (TAB. XXIII.)

a. minor; stems shorter; leaves flexuose.

Bartramia pomiformis. *Hedw. Sp. Musc. p.* 164. *Smith, Fl. Brit. p.* 1340. *Engl. Bot. t.* 998. *Turn. Musc. Hib. p.* 108. *Hook. in Fl. Lond. ed.* 2. *(with a figure.) Schwaegr. Suppl. v.* 1. *P. II. p.* 145. *t.* 58. *Funck, Deutschl. Moose, t.* 24. *f.* 1. *Hook. Fl. Scot. P. II. p.* 139. *Hobson, Brit. Mosses, v.* 1. *n.* 60. *Drummond, Musc. Scot. v.* 1. *n.* 65. *Brid. Meth. p.* 116. *Arn. Disp. Musc. p.* 40.

Bryum pomiforme. *Linn.*

Bartramia vulgaris. *Moug. et Nestl. n.* 137.

Bryum crispa. *Swartz.—Dill. Musc. t.* 44. *f.* 1.

β. *major*; stems much lengthened out, branched; leaves longer; crisped, especially when dry. *Hook. in Fl. Lond. ed.* 2. *(with a figure.) Hook. Fl. Scot. P. II. p.* 140. *Arn. Disp. Musc. p.* 40.

Bartramia crispa. *Brid. Musc. v.* 2. *P. III. t.* 1. *f.* 4. *Turn. in Ann. of Bot. v.* 1. *p.* 527. *Engl. Bot. t.* 1526. *Schwaegr. Suppl. v.* 1. *P. II. p.* 146. *t.* 59. *Funck, Deutschl. Moose, t.* 24. *f.* 2.

HAB. Heaths and dry banks. β. principally in subalpine countries.

Of this species, the stems are extremely variable, from half an inch to three or four inches in length. In the largest state, it becomes the *B. crispa* of many authors; but we must confess, that, except in this particular, and the longer and more crisped leaves, we perceive no difference between this and the more usual appearance of the plant; hence we are disposed, as Mohr, and the Editor of the last edition of *Flora Londinensis* have done, to consider them only varieties. Schwaegrichen has represented the leaves of the var. α. broader and shorter, and less serrated than our specimens exhibit them.

2. *B. ithyphylla*; stems short, leaves rigid erecto-patent subulato-setaceous almost entire, the nerve half way up passing into the substance of the leaf straight when dry, fruitstalks much elongated. (TAB. XXII.)

Bartramia ithyphylla. *Brid. Musc. v.* 2. *t.* 1. *f.* 6. *Engl. Bot. t.* 1710. *Schwaegr. Suppl. v.* 1. *P. II. p.* 51. *t.* 60? *Moug. et Nestl. n.* 622. *Hook. Fl. Scot. P. II. p.* 140. *Hobson, Brit. Mosses, v.* 2. *n.* 53. *Funck, Deutschl. Moose, t.* 24. *f.* 4. *Drummond, Musc. Scot. v.* 1. *n.* 66. *Arn. Disp. Musc. p.* 40.

HAB. Dry banks in mountainous situations. Very fine among the Clova mountains, Scotland.—*Mr. Drummond.*

Stems generally about half an inch long, growing, as in all the species of this genus, in a tufted manner. Sometimes the plants have proliferous shoots, which cause the fruitstalks to appear lateral. Its straight and rigid leaves, and their more glaucous colour, will, even at first sight, distinguish this from the small varieties of *B. pomiformis*, and on a closer examination, a still greater difference may be discovered in their structure. They are very narrow, scarcely at all serrated, and only towards

the extremity; and what is more remarkable, the nerve, when it reaches about half way from the base, dilates and unites with the substance of the leaf. Hence it becomes thick and rigid, remaining nearly as straight when dry as when wet, which is never the case with the preceding species. This conformation of the leaf is not represented in the figures of Schwaegrichen; and most of those of the plant itself are so much larger than the individuals we have seen, that we cannot help quoting his synonym with a mark of doubt.

3. *B. gracilis;* stems elongated, leaves recurvo-patent lanceolate canaliculate serrated, fruitstalks lateral from innovations. (Tab. XXIII.)

Bartramia gracilis. *Flörke in Schrad. Journ.—Smith, Fl. Brit. p.* 1341. *Engl. Bot. t.* 1826. *Hook. Fl. Scot. P. II. p.* 140. *Drummond, Musc. Scot. v.* 1. *n.* 70. *Arn. Disp. Musc. p.* 40.

Bartramia Œderiana. *Swartz, in Schrad. Journ.*

Bartramia Œderi. *Schwaegr. Suppl. v.* 1. *P. II. p.* 49. *t.* 59. *Moug. et Nestl. n.* 326. *Funck, Deutschl. Moose, t.* 24. *f.* 3.

Bartramia longiseta. *Brid. Meth. p.* 116.

Bartramia grandiflora. *Brid. Meth. p.* 116. *Schwaegr. Suppl. v.* 1. *P. II. p.* 48. *t.* 58.

Hab. Rocks in alpine districts.

This, like most of the other individuals of the genus, varies considerably in length, from one or two, to even three inches. It is known by its deep colour, its short, patent, or recurved, and rather distantly placed leaves, and by the fruitstalks, which, owing to the innovations of the stems, have a lateral appearance, and scarcely exceed the tops of the branches. *B. longiseta* of Bridel, is, we believe, generally acknowledged to be the same with our plant; and we are unable to detect any essential point of difference in the American *B. grandiflora* of Schwaegrichen.

4. *B. fontana;* stems fastigiate, leaves closely imbricated rigid erect broadly ovate or lanceolate acuminated nearly plane serrated, fruitstalks lateral from innovations. (Tab. XXIII.)

a. major; stems from three to six inches in length; leaves broadly ovate acuminate.

Bartramia fontana. *Swartz, in Schrad. Journ.—Turn. Musc. Hib. p.* 107. *Moug. et Nestl. n.* 36. *Hook. Fl. Scot. P. II. p.* 140. *Hobson, Brit. Mosses, v.* 1. *n.* 61. *Drummond, Musc. Scot. v.* 1. *n.* 68.

Funck, Deutschl. Moose, t. 24. *f.* 6. *Brid. Meth. p.* 116. *Schwaegr. Suppl. v.* 1. *P. II. p.* 61. *Arn. Disp. Musc. p.* 41.

Bartramia falcata. *Hook. in Linn. Trans. v.* 9. *p.* 317.

Mnium fontanum. *Linn.—Hedw. Sp. Musc.*

Bryum fontanum. *Engl. Bot. t.* 390.

β. *marchica*; stems from half an inch to an inch long; leaves lanceolate, acuminated.

Bartramia marchica. *Swartz, in Schrad. Journ.—Schwaegr. Suppl. v.* 1. *P. II. p.* 59. *Engl. Bot. t.* 2074. *Moug. et Nestl. n.* 623. *Funck, Deutschl. Moose, t.* 24. *n.* 5.

Mnium marchicum. *Hedw. St. Cr. v.* 2. *t.* 39.

Bartramia fontana. β. pumila. *Turn. Musc. Hib. p.* 107. *t.* 10. *f.* 1.

HAB. Wet places in a turfy soil.

Not only do the stems of this moss vary much in size, but the leaves also in size and direction, and we have seen specimens, which we have gathered both in Switzerland and Scotland, with leaves as decidedly curved to one side as in *B. falcata* of Hooker in *Linn. Trans.*, whence we are led to suppose that even that species may be a variety of *B. fontana*. *B. marchica* we have traced, from its usually small size, up to the true and common appearance of the present species; and, indeed, the var. β. of Mr. Turner is so intermediate between the two kinds now mentioned, that we hesitated for some while to which to refer it. *B. radicalis, Muhlenbergii, uncinata*, and even *B. sphærocarpa*, all of Schwaegrichen, can, we fear, only be considered as slight varieties of this very fallacious plant, which, in some state or other, seems to grow in every part of the world.

* * *Fruitstalks very short, curved.*

5. *B. Halleriana*; stems much elongated proliferous, leaves long subulate flexuose serrated above, fruitstalks lateral from innovations very short curved. (TAB. XXIII.)

Bartramia Halleriana. *Hedw. St. Cr. v.* 2. *t.* 40. *Turn. Musc. Hib. p.* 109. *Smith, Fl. Brit. p.* 1339. *Engl. Bot. t.* 997. *Moug. et Nestl. n.* 35. *Funck, Deutschl. Moose, t.* 24. *f.* 7. *Hook. Fl. Scot. P. II. p.* 140. *Hobson, Brit. Mosses, v.* 2. *n.* 54. *Drummond, Musc. Scot. v.* 1. *n.* 57. *Schwaegr. Suppl. v.* 1. *P. II. p.* 64. *Brid. Meth. p.* 115. *Arn. Disp. Musc. p.* 40.

Bryum laterale. *Dicks.*

HAB. Moist mountain rocks.

The foliage of this has great affinity with that of *B. pomiformis* β., and the stems vary from two to five and six inches. These, however, are exceedingly proliferous, throwing off their shoots from the summits, whence the fruit of the two or three preceding years, still remaining on the stems, has the appearance of being lateral. The fruitstalks are very short and curved. Capsules globose, much furrowed. The stems, as in most of the species, are covered with thick, fuscous, downy roots. Mr. Arnott is disposed to consider this moss as a state of *B. pomiformis* β.

6. *B. arcuata;* stems much elongated proliferous, leaves horizontally patent ovato-lanceolate acuminated serrated striated, fruitstalks very short arcuate at length lateral, capsule smooth. (TAB. XXIII.)

Bartramia arcuata. *Brid. Musc. v.* 4. *p.* 139. *Turn. Musc. Hib. p.* 109. *Smith, Fl. Brit. p.* 1343. *Engl. Bot. t.* 1237. *Schwaegr. Suppl. t.* 62. *Hook. Fl. Scot. P. II. p.* 140. *Hobson, Brit. Mosses, v.* 1. *n.* 62. *Drummond, Musc. Scot. v.* 1. *n.* 69. *Schwaegr. Suppl. v.* 1. *P. II. p.* 61. *t.* 62. *Arn. Disp. Musc. p.* 41. *Brid. Meth. p.* 116.
Mnium arcuatum. *Dicks. Pl. Crypt. Fasc.* 3. *p.* 2. *t.* 7. *f.* 3.
Hypnum chrysocomum. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 12.

HAB. Mountains of England, Scotland, Wales, and Ireland. In the greatest profusion upon wet rocks at Lowdore Waterfall and Keswick. In fructification abundantly at Lidford Fall, Devon.—*Dr. Greville.*

This extremely beautiful moss, unknown on the Continent, is rare in most parts of England; yet in the mountainous districts of Ireland is of very common occurrence. It is readily enough known from all the rest of the genus by its perfectly globose, large, and smooth capsules, by the greater flexibility of the stems and rigidity of its leaves, which never become twisted or curled by drying. These leaves resemble most those of *B. gracilis*, but they are broader at the base, striated, and of a bright shining yellow green colour. Schwaegrichen gives the Isle of France, St. Domingo, and Jamaica, as stations for this species, the latter on the authority of Swartz's *Mnium tomentosum*, which, however, we have ascertained to be a different species, having long fruitstalks and capsules, the former upright, the latter deeply furrowed.

XXXII. HOOKERIA.—*(Smith, not Schwaegrichen.)*

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double; the *exterior* of 16 teeth, the *interior* of a membrane divided into 16 entire segments; *Calyptra* mitriform. (TAB. III.)

The only two British individuals of this genus have a peculiarity in their habit, in their plane surculi, and bifarious succulent leaves, which seem in themselves to point out a family different from *Hypnum* and *Leskea*, with which they have been hitherto united; and the mitriform calyptra affords a character which we consider of the highest importance. We are acquainted with several exotic species, which agree with them in all these particulars.*

1. *H. lucens;* leaves broadly ovate entire obtuse nerveless. (TAB. XXVII.)

Hookeria lucens. *Smith, in Linn. Trans. v. 9. p. 276. Engl. Bot. t. 1902. Hook. Fl. Scot. P. II. p. 141. Hobson, Brit. Mosses, v. 1. n. 63. Drummond, Musc. Scot. v. 2. n. 61. Hook. and Grev. in Edin. Journ. of Science, v. 2. p. 225. Arn. Disp. Musc. p. 56.*

Hypnum lucens. *Linn. Sp. Pl. p. 1589. Hedw. Sp. Musc. p. 243. Turn. Musc. Hib. p. 155. Moug. et Nestl. n. 40. Smith, Fl. Brit. p. 1295.*

Leskea lucens. *Decand. Fl. Gall. Syn.—Schwaegr. Suppl. v. 1. P. II. p. 164. t. 84. Funck, Deutschl. Moose, t. 35. f. 3.*

Pterigophyllum lucens. *Brid. Meth. p. 149.*

HAB. Moist banks in woods and among rocks.

Stems procumbent, from two to four inches long; slightly branched, plane. Leaves arranged on four sides, but bifarious in their direction, quite plane, of a very succulent texture, reticulated, with the meshes large, the margin not thickened, nerve none. From the points of the leaves, roots are often emitted. Fruitstalks about an inch long, curved at the summit. Capsules ovate, horizontal, reticulated; lid conico-rostrate. Calyptra thin, whitish, faintly reticulated, mitriform, jagged at the base. Peristome exactly as in the Hedwigian genus *Leskea*, and as represented by Schwaegrichen and Smith.

2. *H. læte-virens;* leaves ovate acuminulate margined very obscurely

* See Hooker and Greville in the Second Volume of Brewster's Edinburgh Journal of Science, p. 221. for further remarks upon this genus.

serrated at the extremity with two nerves reaching nearly their whole length. (Tab. XXVII.)

Hookeria læte-virens. *Hooker and Tayl. Musc. Brit. ed.* 1. *Hook. and Grev. in Edin. Journ. of Science, v.* 2. *p.* 230. *Arn. Disp. Musc. p.* 56.

Hab. Wood near Cork in tolerable plenty, but rare in fruit. —*Mr. Drummond.*

Stems from two to three inches in length, branched in an irregularly pinnated manner, compressed. Leaves arranged on four sides, but bifarious in their direction, ovate, slightly concave, their margin thickened, their point acuminulate, and, under a microscope, slightly serrated, nerves two to each leaf, standing considerably apart, and running up to more than three-fourths of the length of the leaf; reticulation very evident but not so large, nor the leaves so succulent as in the last species. Fructification as in *H. lucens.*

Our friend Mr. Drummond of Cork had the good fortune to discover this elegant plant, and was so kind as to communicate specimens to us in the year 1816. No one, on examining the leaves with the slightest attention, can have any difficulty in distinguishing this moss from *H. lucens;* and even the whole plant, in its smaller size, brighter green colour, and more membranaceous foliage, is sufficiently striking. It is not with the other British species that it can ever be confounded, but with the figure of *Leskea albicans,* (an undoubted *Hookeria,*) it bears so perfect an accordance that few Botanists would venture on pronouncing them different species, without as cautious a comparison between authentic specimens as we have ourselves made. In *L. albicans,* the colour is very much paler, and has given rise to its specific name; the leaves are of a thinner texture, and furnished with reticulations so remarkably large, that when a leaf of each is seen on the table of a microscope, at the same time, a tyro in the science would say that they could not belong to the same species. Moreover, in *L. albicans* the margin of the leaf is thicker, and the leaves are much more deeply serrated. In other respects, the foliage perfectly accords. But there appears a dissimilarity in the operculum, which is shorter in the *L. albicans,* and the calyptra is not only of a different texture, but cleft at the base, like the veil of a *Trichostomum,*

or a *Grimmia*. We are aware how difficult it is to frame characters in a few words, which may separate plants so closely allied; and we should not be disposed to disagree much with those who, after a due investigation of the peculiarities of each species, might choose to consider them varieties arising from the difference of soil and climate; the one being found on the trunks of decaying trees in Jamaica, the other in Ireland, in a wood, close by a spring, which has been ascertained to have a higher temperature than any neighbouring spring, and in a spot warmer, perhaps, than any other in Britain.

There is still another plant which we cannot pass over unnoticed, since in the form of the leaves, and its two nerves, and mitriform calyptra, (making it a *Hookeria*,) there is the most perfect conformity. We mean the *Leskea depressa* of Swartz and Hedwig; and also a native of Jamaica. But this is a smaller plant; its surculi, though depressed, have not the leaves so decidedly bifarious, nor are these latter nearly so strongly reticulated; their margin is not thickened, nor at all serrated; and the lid of the capsule is shorter.

XXXIII. HYPNUM.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double; the *exterior* of 16 teeth; the *interior* of a membrane cut into 16 equal segments, with filiform processes frequently placed between them; *Calyptra* dimidiate. (TAB. III.)

In so extensive a genus as the present we would gladly follow many of the most eminent Muscologists in keeping *Leskea* apart from it, were not the character of that genus so difficult to be discovered, and the individuals which compose it so closely allied in other respects to the rest of the *Hypna*. The character is, as is well known, founded upon the absence of the filiform processes between the segments of the inner peristome. These, indeed, vary in number; and some of the real *Hypna* of authors, such as *H. lutescens*, have very short processes, which make them exactly intermediate between *Hypnum* and *Leskea*.

I. *Stems, (taken in conjunction with the leaves,) plane.*

1. *Capsules erect.*

1. *H. trichomanoides;* leaves broadly scymitar-shaped serrated at the point nerve reaching to the middle of the leaf, capsule ovate erect, lid rostrate. (Tab. XXIV.)

Hypnum trichomanoides. *Schreb. Fl. Lips.—Turn. Musc. Hib. p.* 145. *Smith, Fl. Brit. p.* 1287. *Engl. Bot. t.* 1493. *Hook. Fl. Scot. P. II. p.* 141. *Hobson, Brit. Mosses, v.* 1. *n.* 64. *Drummond, Musc. Scot. v.* 1. *n.* 73. *Arn. Disp. Musc. p.* 58.

Leskea trichomanoides. *Hedw.—Moug. et Nestl. n.* 139. *Funck, Deutschl. Moose, t.* 35. *f.* 2. *Brid. Meth. p.* 143. *Schwaegr. Suppl. v.* 1. *P. II. p.* 163.—*Dill. Musc. t.* 34. *f.* 8.

Hab. Trunks of trees, not rare.

The remarkable curvature of the leaf, which we have endeavoured to express by the word *scymitar-shaped*, is peculiar to this species of *Hypnum*.

2. *H. complanatum;* leaves oblong apiculate entire nerveless, capsule ovate erect, lid rostrate. (Tab. XXIV.)

Hypnum complanatum. *Linn. Sp. Pl. p.* 1588. *Turn. Musc. Hib. p.* 144. *Smith, Fl. Brit. p.* 1286. *Engl. Bot. t.* 1492. *Hook. Fl. Scot. P. II. p.* 141. *Hobson, Brit. Mosses, v.* 1. *n.* 65. *Drummond, Musc. Scot. v.* 1. *n.* 72. *Arn. Disp. Musc. p.* 58.

Leskea complanata. *Hedw.—Moug. et Nestl. v.* 328. *Funck, Deutschl. Moose, t.* 35. *f.* 1. *Schwaegr. Suppl. v.* 1. *P. II. p.* 163. *Brid. Meth. p.* 143.—*Dill. Musc. t.* 34. *f.* 7.

Hab. Trunks of trees, common.

This elegant species, as well as the preceding, as we have already intimated, comes very nearly in habit to the *Neckeræ*, particularly to *N. pumila*.

2. *Capsules cernuous or inclined.*

3. *H. riparium;* leaves ovato-lanceolate acuminated entire the nerve reaching almost to the summit, capsule oblong cernuous, lid conical. (Tab. XXIV.)

Hypnum riparium. *Linn. Sp. Pl. p.* 1595. *Hedw. St. Cr. v.* 4. *t.* 3. *Turn. Musc. Hib. p.* 152. *Smith, Fl. Brit. p.* 1292. *Engl. Bot. t.* 2060. *Hook. Fl. Scot. P. II. p.* 141. *Hobson, Brit. Mosses, v.* 1. *n.* 66. *Funck, Deutschl. Moose, t.* 37. *f.* 4. *Brid. Meth. p.* 157.

Schwaegr. Suppl. v. 1. *P. II. p.* 194. *Arn. Disp. Musc. p.* 58.—*Dill. Musc. t.* 40. *f.* 44. B. C. D.

Hypnum trichopodium, longifolium, obscurum, laxum? and Sipho. *Brid. Meth. (according to Mr. Arnott.)*

HAB. Banks of rivers, and in spots occasionally overflowed.

Stems from four to five inches in length. Colour dirty yellow-green.

4. *H. undulatum*; leaves ovate acute transversely undulated with two faint nerves at the base, capsule oblong furrowed arcuato-cernuous, lid rostrate. (TAB. XXIV.)

Hypnum undulatum. *Linn. Sp. Pl. p.* 1589. *Turn. Musc. Hib. p.* 154. *Smith, Fl. Brit. p.* 1294. *Engl. Bot. t.* 1181. *Moug. et Nestl. n.* 45. *Hook. Fl. Scot. P. II. p.* 141. *Funck, Deutschl. Moose, t.* 37. *f.* 3. *Hobson, Brit. Mosses, v.* 1. *n.* 68. *Drummond, Musc. Scot. v.* 1. *n.* 75. *Brid. Meth. p.* 156. *Schwaegr. Suppl. v.* 1. *P. II. p.* 197. *Arn. Disp. Musc. p.* 59.—*Dill. Musc. t.* 35. *f.* 11.

HAB. In woods and dry heathy places.

This fine species, which is often four or five inches in length, differs most strikingly from the rest of the genus by its peculiar habit, its white membranaceous and undulated leaves; and still more remarkably from all its British congeners by its furrowed capsules, giving it the same relation with the *Hypna* as *Mnium* bears to *Bryum*; and it might with equal propriety be separated.

5. *H. denticulatum*; leaves ovate sometimes approaching to lanceolate more or less acuminated having two short nerves at the base, capsule oblongo-cylindraceous inclined, lid conical. (TAB. XXIV.)

α. angustifolium; leaves ovato-lanceolate, distant, quite plane.

Hypnum denticulatum. *Linn. Sp. Pl. p.* 1588. *Hedw. St. Cr. v.* 4. *t.* 31. *Turn. Musc. Hib. p.* 148. *t.* 12. *f.* 1. *Smith, Fl. Brit. p.* 1288. *Engl. Bot. t.* 1260. *Moug. et Nestl. n.* 46. *Hook. Fl. Scot. P. II. p.* 141. *Funck, Deutschl. Moose, t.* 37. *f.* 1. *Hobson, Brit. Mosses, v.* 1. *n.* 67. *Drummond, Musc. Scot. v.* 1. *n.* 74. *Brid. Meth. p.* 153. *Schwaegr. Suppl. v.* 1. *P. II. p.* 187. *Arn. Disp. Musc. p.* 58.

Hypnum sylvaticum. *Moug. et Nestl. n.* 515. *Funck, Deutschl. Moose, t.* 37. *f.* 2. *Brid. Meth. p.* 153. *Schwaegr. Suppl. v.* 1. *P. II. p.* 182. *t.* 82.—*Dill. Musc. t.* 34. *f.* 5.

β. obtusifolium; leaves ovate, more or less obtuse, slightly concave.

Hypnum denticulatum. β. obtusifolium. *Turn. Musc. Hib. p.* 146. *t.* 12. *f.* 2.

Hypnum obtusatum. *Wahl. Fl. Lapp. p.* 371.

Hypnum Donianum. *Engl. Bot. t.* 1446.

Hypnum obtusifolium. *Brid. Meth. p.* 153.

HAB. Principally in woods. β. among the mountains.

This species varies extremely in its size, somewhat in colour, and greatly in the figure, and even in the texture of the leaves. In our α, the most common state of the plant, the leaves are almost exactly distichous, horizontal, narrow, and acuminate, so distant as to resemble teeth set along the stem, and better agreeing with the Dillenian figures than with those of Hedwig, which perhaps more properly belong to our β. In this the leaves are broader, more concave and obtuse, less truly distichous, and their structure is, under the microscope, more reticulated. This is the var. γ. *obtusifolium* of Turner, and *H. obtusatum* of Wahlenberg, and the *H. Donianum* of Smith. We would gladly follow the two last named able Botanists in keeping this distinct as a species from α. did we not possess specimens in an intermediate state, both with regard to the form of the leaf, its reticulated structure, and even the direction of the foliage. All coincide in having the same, almost cylindraceous, inclined capsule, and conical lid, and in having a short, forked, or double nerve.

II. *Stems, (taken in conjunction with the leaves,) more or less cylindrical, never plane.*

1. *Leaves spreading on all sides of the stem.*‖

A. *Leaves uniform in their direction, (not squarrose.)*

a. *Nerve reaching to, or beyond the point.*

* *Leaves without serratures.*

6. *H. medium ;* leaves ovate obtuse concave entire slightly falcato-secund nerve reaching to the summit, capsule cylindrical nearly erect, lid conical. (TAB. XXIV.)

Hypnum medium. *Dicks. Crypt. Fasc.* 2. *p.* 12. *Turn. Musc. Hib.*

‖ In opposition to "leaves secund."

p. 142. *Smith, Fl. Brit. p.* 1280. *Engl. Bot. t.* 1274. *Hook. Fl. Scot. P. II. p.* 142. *Hobson, Brit. Mosses, v.* 2. *n.* 55. *Arn. Disp. Musc. p.* 67.

Hypnum inundatum. *Dicks.—Turn. Musc. Hib.—Smith, Fl. Brit. p.* 1282. *Engl. Bot. t.* 1922.

Leskea polycarpa. *Ehrh. Crypt.—Hedw.—Moug. et Nestl. n.* 224. *Funck, Deutschl. Moose, t.* 35. *f.* 4. *Brid. Meth. p.* 146. *Schwaegr. Suppl. v.* 1. *P. II. p.* 171.

Hypnum circinnatum. *Brid. Meth. p.* 165.

HAB. Trunks of trees, near the ground.

Whole plant much crowded in its growth, of a very lurid colour. Leaves opaque (often falcato-secund, so that Mr. Arnott has, perhaps with justice, arranged it with the species "foliis secundis;") the margins recurved; in which particulars it differs from the *Leskea paludosa* of Hedwig, as well as in the nerve, which in the latter disappears before it reaches the point.

7. *H. tenellum;* leaves fasciculate erect lanceolato-subulate entire their nerve reaching to the summit, capsule ovate cernuous, lid rostrate. (TAB. XXIV.)

Hypnum tenellum. *Dicks. Crypt. Fasc.* 4. *t.* 11. *f.* 12. *Turn. Musc. Hib. p.* 170. *Smith, Fl. Brit. p.* 1308. *Engl. Bot. t.* 1859. *(figure of the leaf incorrect.) Hook. Fl. Scot. P. II. p.* 142. *Drummond, Musc. Scot. v.* 2. *n.* 63. *Arn. Disp. Musc. p.* 62.

Hypnum algerianum. *Brid. Meth. p.* 168. *Schwaegr. Suppl. v.* 2. *p.* 161. *t.* 144.

HAB. On rocks, especially such as are calcareous, and on old walls.

This moss is but little known to continental writers, as appears by Mohr's observation, that it agrees well with *H. serpens*, and by Schwaegrichen's description, where he says that its nerve reaches only half way up the leaf. From *H. serpens* our plant differs in its mode of growth, its fascicled branches, the shape and texture of the leaves, and rostrate lid. Its nearest affinity is with *H. populeum*, from which it may be known by its narrower, entire leaves, as well as its long operculum. The representation of the leaf in *English Botany* is extremely incorrect, and the nerve is wholly omitted.

8. *H. serpens;* leaves ovato-lanceolate rather obtuse patent entire their nerve for the most part reaching to the summit, capsule cylindrical curved cernuous, lid conical. (TAB. XXIV.)

Hypnum serpens. *Linn. Sp. Pl. p.* 1596. *Turn. Musc. Hib. p.* 168. *Smith, Fl. Brit. p.* 1306. *Engl. Bot. t.* 1037. *Moug. et Nestl. n.* 332. *Hook. Fl. Scot. P. II. p.* 142. *Funck, Deutschl. Moose, t.* 45. *f.* 50. *Hobson, Brit. Mosses, v.* 1. *n.* 70. *Drummond, Musc. Scot. v.* 1. *n.* 77. *Brid. Meth. p.* 183. *Arn. Disp. Musc. p.* 62. *Schwaegr. Suppl. v.* 1. *P. II. p.* 260.

Hypnum fluviatile. *Funck, Deutschl. Moose, t.* 45. *f.* 49. *Brid. Meth. p.* 182.

Hypnum tenue. *Schrad.*

Hypnum contextum, and H. spinulosum. *Hedw.*—and H. flagelliforme, microphyllum, radicale, subtile, inordinatum? and orthocladon? of *Brid.*

Hypnum subtile. *Dicks.—Turn.—Smith, in Fl. Brit. and in Engl. Bot. t.* 2496.—*Dill. Musc. t.* 42. *f.* 64.

Hab. Moist banks, trunks of trees, on pales and decayed wood in various situations. Mr. Drummond's specimens are remarkably tufted, having been gathered on an old wall near Forfar.

Schwaegrichen has well observed of this species, "vix datur exemplum tantæ inconstantiæ nervi in ullo Hypno;" for different leaves on the same individual have the nerve varying much in length; yet in the older stems it will generally be found reaching to the point, and of a dark brown colour. It is the almost total disappearance of the nerve in some instances, that has caused this moss to be mistaken for the *Leskea subtilis* of Hedwig, which has the true fringe of a *Leskea*, and has not, we believe, yet been found in Britain. The capsules of *H. subtile* in *English Botany* are figured from foreign specimens. Our own examination of the Dillenian Herbarium does not confirm the opinion of Mr. Turner, that the specimens represented in the *Historia Muscorum, t.* 42. *f.* 64. are those of *Leskea subtilis*. We have accordingly referred to that figure under the present plant.

The specimens of Funck of *H. fluviatile*, seem to be only the aquatic variety of *H. serpens;* and if Hedwig's be the same, as we really believe, then that must also be brought as a synonym to the present species.

Hedwig's figure of *H. fluviatile* is almost universally cited as the same with *H. Vallisclausæ*, or *H. fallax* of Bridel, and approaches as closely to it as to *H. serpens*. *H. fallax* of Bridel is

also described as having "folia integerrima." Weber and Mohr bring both these species *next* to *H. serpens.*

Mr. Arnott considers *H. radicale,* (Schwaegr.) as identical with this plant, and that there does not exist any good specific difference between it and *H. inordinatum, H. fragile, H. tenax,* (Hedw.) and *H. orthocladon?*

* * *Leaves serrated.*

9. *H. populeum;* leaves erect lanceolate acuminated serrated margin slightly reflexed, nerve reaching to the point, capsule ovate subcernuous, fruitstalks rough, lid conical. (TAB. XXIV.)

Hypnum populeum. *Hedw. Sp. Musc. t.* 70. *f.* 1—6. *Moug. et Nestl. n.* 519. *Hook. Fl. Scot. P. II. p.* 142. *Hobson, Brit. Mosses, v.* 1. *n.* 69. *Drummond, Musc. Scot. v.* 1. *n.* 78. *Brid. Meth. p.* 172. *Funck, Deutschl. Moose, t.* 42. *f.* 33. *Arn. Disp. Musc. p.* 65. *Schwaegr. Suppl. P. II. p.* 238.

Hypnum implexum. *Swartz.—Turn. Musc. Hib. p.* 173. *t.* 16. *Smith, Fl. Brit. p.* 1310. *Engl. Bot. t.* 1584.

Hypnum petrophilum. *Funck, Deutschl. Moose, t.* 45. *f.* 46.

HAB. On trees and rocks.

Mohr appears to us rightly to have united the *Hypnum implexum* of Swartz and Turner to the Hedwigian *H. populeum. H. Starkii* of Schleicher's Catalogue, if we may judge from specimens sent by that Botanist to Mr. Turner, differs in no particular from our plant; while Mohr describes his species under that name as having a cordate base to the leaves, and an evanescent nerve.

10. *H. reflexum;* leaves cordato-acuminate serrated their nerve reaching to the point their margin slightly reflexed, capsule ovate cernuous, fruitstalks rough, lid conical. (TAB. XXIV.)

Hypnum reflexum. *Weber et Mohr. Fl. Crypt. Germ. p.* 306. *and* 476. *Schwaegr. Suppl.* 3. *t.* 143. *Brid. Meth. p.* 170. *Hook. Fl. Scot. P. II. p.* 142. *Funck, Deutschl. Moose, t.* 46. *f.* 55. *Arn. Disp. Musc. p.* 65. *Schwaegr. Suppl. v.* 2. *p.* 161. *t.* 143.

HAB. On Ben Nevis, near the base of the mountain. On Ben Lawers.—*Dr. Greville.*

We have compared our plants with those of the original

discoverer, Mr. Starke, and find them to agree in every particular. Its habit is very different from that of the preceding species; it is more straggling in its mode of growth, and the leaves are broader and shorter, especially those of the main stem, which are widely cordate, with a suddenly acuminated point.

b. *Nerve shorter than the leaf, or none.*

* *Leaves entire.*

† *Leaves ovate, or elliptical.*

11. *H. molle;* leaves loosely imbricated rotundato-ovate obtuse concave entire faintly two nerved at the base or with one short nerve, capsule ovate cernuous, lid conical. (Tab. XXIV.)

Hypnum molle. *Dicks. Pl. Crypt. Fasc.* 2. *t.* 5. *f.* 8. *Hedw. Sp. Musc. t.* 70. *f.* 7—10. *Smith, Fl. Brit. p.* 1312. *Engl. Bot. t.* 1992. *Hook. Fl. Scot. P. II. p.* 142. *Funck, Deutschl. Moose, t.* 40. *f.* 18. *Moug. et Nestl. n.* 730. *Hobson, Brit. Mosses, v.* 2. *n.* 56. *Drummond, Musc. Scot. v.* 2. *n.* 64. *Brid. Meth. p.* 162. *Arn. Disp. Musc. p.* 59. *Schwaegr. Suppl. v.* 1. *P. II. p.* 220.

Hypnum alpestre. *Swartz, Musc. Suec. p.* 63. *t.* 6. *f.* 15. *Hedw. Sp. Musc. t.* 64. *f.* 1—4.

Hab. Alpine rivulets in Scotland.

This plant usually is found from two to three inches in length, much tufted, and consequently with the branches often erect, and bare of leaves at the base. Leaves of a thin membranaceous texture, very dark, lurid green colour, concave, varying in the nerve, which is either single or double. Swarts's plant, *(H. alpestre,)* is certainly of a more rigid texture, its leaves are more patent, and the nerve is more evident in general, the colour is yellower at the extremities of the branches; yet we cannot look upon them otherwise than as the same species; but Mohr's *H. trifarium*, which Schwaegrichen has made a variety of *H. stramineum*, differs in its larger size, narrower leaf, and longer nerve. On the other hand, Schleicher's *H. uliginosum*, which Mohr allows to be his *H. trifarium*, exactly corresponds with our plant.

12. *H. Schreberi;* leaves closely imbricated nearly erect elliptical apiculate concave entire faintly two nerved at the base, capsule ovate cernuous, lid conical. (TAB. XXIV.)

Hypnum Schreberi. *Willd. Fl. Berol. p.* 325. *Dicks.—Turn. Musc. Hib. p.* 176. *Smith, Fl. Brit. p.* 1315. *Engl. Bot. t.* 1621. *Brid. Meth. p.* 159. *Funck, Deutschl. Moose, t.* 40. *f.* 20. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 1. *n.* 71. *Drummond, Musc. Scot. v.* 1. *n.* 81. *Arn. Disp. Musc. p.* 60. *Schwaegr. Suppl. v.* 1. *P. II. p.* 227.

Hypnum curlandicum. *Brid. Meth. p.* 160.

Hypnum purum. *Ehrh.*

Hypnum compressum. *Schreb.*

Hypnum muticum. *Swartz.—Moug. et Nestl. n.* 43.—*Dill. Musc. t.* 40. *f.* 7.

HAB. Woods and banks among bushes.

This species has been confounded with *H. purum*, but it is a longer, more slender, and compressed moss; the stalks are always of a fine reddish tint; the leaves have a very faint and short double nerve, and are of a brighter yellow-green colour.

13. *H. moniliforme;* leaves closely imbricated rotundato-ovate obtuse very concave ventricose nerveless, capsule ovate nearly erect. (TAB. XXIV.)

Hypnum moniliforme. *Wahl. Fl. Lapp. p.* 376. *t.* 24. *Hook. Fl. Scot. ed.* 2. *ined. Hobson, Brit. Mosses, v.* 2. *n.* 57. *Arn. Disp. Musc. p.* 60.

Leskea julacea. *Mohr.—Brid. Meth. p.* 145.

Hypnum julaceum. *Schwaegr. Suppl. t.* 89. *Funck, Deutschl. Moose, t.* 39. *f.* 14. *Brid. Meth. p.* 162. *Schwaegr. Suppl. v.* 1. *P. II. p.* 216. *t.* 89.

Pterogonium? rotundifolium. *Engl. Bot. t.* 2525.

HAB. On the ground, among mosses, in the south of Ireland.—*Mr. Mackay.* Not uncommon on rocks in the Breadalbane mountains.

This very curious plant, so nearly approximating in specific character to *H. molle*, is very distinct from it as well as from every other known *Hypnum*; it scarcely exceeds an inch in length, and its foliage is so closely imbricated and concave as to resemble *Bryum argenteum*, or *B. Zierii*. The colour is a pale yellow-green; the perichætial leaves of a reddish brown, lanceolate, nerveless. Fruitstalks about an inch long; capsule

erect, lid conical. With us, this moss has not been found in fructification; but we have fine specimens in that state from Switzerland; from which our figure and description were made. Sir James E. Smith, who had never seen the capsules, was perfectly correct in stating his doubts as to whether this moss belonged to the genus *Pterogonium*. Wahlenberg, who first described and figured this species, originally called it *Leskea julacea*; but afterwards changed the specific name to the scarcely less applicable one here adopted.

14. *H. catenulatum*; leaves subpatent ovate subacuminated papillose on the back and margin with a very short nerve, capsule ovate inclined, lid conical acuminated. (TAB. XXIV.)

Hypnum catenulatum. *Schwaegr. Suppl. p.* 218. *Brid. Meth. p.* 167. *Hobson, Musc. Brit. v.* 2. *n.* 58. *Funck, Deutschl. Moose, t.* 39. *f.* 16. *Arn. Disp. Musc. p.* 63.

Hypnum Conferva. *Schwaegr. Suppl. v.* 2. *P. II. p.* 158. *t.* 142.

Pterigynandrum catenulatum. *Brid. Musc. p.* 64. *t.* 5. *f.* 4.

Grimmia catenulata. *Mohr.*

HAB. Wet rocks at the Dargle, and at Powerscourt near Dublin, abundant. Ben Lawers.—*Dr. Greville.* Campsie Hills near Glasgow.—*Mr. Arnott.*

We believe we are correct in considering this moss, (which we have seen in various collections, and which we suspect to be figured in *Engl. Bot.** as *Pterogonium filiforme*,) to be the true *H. catenulatum* of Schwaegrichen. This is a genuine *Hypnum*, having a single filiform process between the segments of the inner peristome, as Wahlenberg has represented in his *H. moniliforme*. The stems are closely tufted, from one to two inches in length, rigid; leaves rather distant, of a dark green colour, their margins appearing as it were serrated from the papillose surface. In our specimens the nerve is short, not more than one fourth of the length of the leaf, whilst in the *H. catenulatum* of Schwaegrichen it is said to disappear beyond the middle,—the only difference we can discover.

15. *H. stramineum*; leaves loosely imbricated erecto-patent oblongo-ovate obtuse entire shining their nerve reaching half

* We mean the specimens received from Mr. Mackay.

way, capsule oblongo-ovate curved cernuous, lid conical. (Tab. XXIV.)

Hypnum stramineum. *Dicks. Pl. Crypt. Fasc.* 1. *t.* 1. *f.* 9. *Turn. Musc. Hib. p.* 164. *Smith, Fl. Brit. p.* 1303. *Engl. Bot. t.* 2465. *Schwaegr. Suppl. t.* 89. *Brid. Meth. p.* 161. *Hook. Fl. Scot. P. II. p.* 143. *Moug. et Nestl. n.* 516. *(excl. var. β. trifarium.) Hobson, Brit. Mosses, v.* 2. *n.* 59. *Drummond, Musc. Scot. v.* 1. *n.* 82. *Funck, Deutschl. Moose, t.* 38. *f.* 9. *Arn. Disp. Musc. p.* 60. *Schwaegr. Suppl. v.* 1. *P. II. p.* 212.

Hypnum longifolium. *Brid. Meth. p.* 184.

Hab. Banks and wet bogs, generally mixed with other mosses. Abundant on the Breadalbane mountains. In fructification in marshy places near Forfar, Scotland. —*Mr. Drummond.*

The slender habit, pale colour, and obtuse leaves, are striking characters in this species. It is incorrectly described in *Fl. Brit.* and in *Engl. Bot.* as having the leaves destitute of a nerve. The fructification is rare. Besides the spot mentioned above, we have seen it in that state near Dublin, with the lower part of the fruitstalks buried for near two inches in a firm sand bank, so that it was scarcely possible to secure good specimens.

16. *H. trifarium;* leaves compactly imbricated ovate obtuse entire concave the nerve disappearing above the middle, capsule oblongo-ovate cernuous, lid conical. (Tab. IV.)

Hypnum trifarium. *Web. et Mohr. Iter Suec. t.* 2. *f.* 2. *a—d. Ejusd. Fl. Crypt. Germ. p.* 319. *Brid. Meth. p.* 161. *Arn. Disp. Musc. p.* 60.

Hypnum stramineum. *β. Schwaegr. Suppl. v.* 1. *P. II. p.* 212. *t.* 89.

Hab. Upon a high mountain, on the ground, at the head of Glen Lochy in Breadalbane; but without fruit.—*Drs. Greville and Hooker.*

This is a dark lurid brown colour, with broader, more concave, and more closely imbricated leaves, which, we think, will sufficiently distinguish it from *H. stramineum.* Our plants exactly accord with Norwegian and Lapland ones.

17. *H. murale;* leaves nearly erect imbricated oval with a very short point concave the entire nerve reaching about half way up, capsule ovate cernuous, lid rostrate. (Tab. XXIV.)

Hypnum murale. *Hedw. St. Cr. v.* 4. *t.* 30. *Dicks.—Turn. Musc. Hib. p.* 166. *Moug. et Nestl. n.* 145. *Smith, Fl. Brit. p.* 1304. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 1. *n.* 72. *Funck, Deutschl. Moose, t.* 38. *f.* 7. *Arn. Disp. Musc. p.* 60. *Brid. Meth. p.* 168. *Schwaegr. Suppl. v.* 1. *P. II. p.* 198.

Hypnum confertum. *Engl. Bot. t.* 1038.

Hypnum abbreviatum. *Hedw. Sp. Musc. t.* 65. *f.* 1—4. *Dill. Musc. t.* 41. *f.* 52.

HAB. On walls and stones.

The rostrate lid and concave shortly-pointed leaves well distinguish this species from its affinities.

18. *H. purum;* leaves closely imbricated oval with a very short point very concave their nerve reaching half way up, capsule ovate cernuous, lid conical. (TAB. XXIV.)

Hypnum purum. *Linn. Sp. Pl. p.* 1594. *Hedw. Sp. Musc. t.* 66. *f.* 3—6. *Turn. Musc. Hib. p.* 175. *Smith, Fl. Brit. p.* 1313. *Engl. Bot. t.* 1599. *Moug. et Nestl. n.* 44. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 1. *n.* 74. *Drummond, Musc. Scot. v.* 1. *n.* 83. *Funck, Deutschl. Moose, t.* 43. *f.* 19. *Brid. Meth. p.* 160. *Schwaegr. Suppl. v.* 1. *P. II. p.* 126. *Arn. Disp. Musc. p.* 60.

Hypnum illecebrum. *Smith, Fl. Brit. and Engl. Bot. t.* 2189. *(not of Hedw.)—Dill. Musc. t.* 40. *f.* 45.

HAB. On the ground, on banks, and in woods, abundant.

The less regularly pinnate state of this moss has been taken by English authors for the *H. illecebrum* of Hedwig, an American plant, and a distinct species; having leaves with more acuminated and serrated points, and with a longer and more decided nerve.*

Dillenius informs us that the specific name of this moss is derived from the habit which prevails in some parts of England, of using it to cleanse the worms for fishermen.

†† *Leaves lanceolate, or subulate.*

+ *Leaves without striæ.*

19. *H. plumosum;* leaves erecto-patent the upper ones sometimes

* Mr. Arnott has recently informed us that the *H. illecebrum* of Hedwig, *Sp. Musc. t.* 25. *f.* 7. has been found in Scotland; but we have seen no specimens.

secund all of them ovato-lanceolate acuminated subserrated the nerve reaching above half way, capsule ovate cernuous, lid conical. (TAB. XXV.)

Hypnum plumosum. *Linn. Sp. Pl. p.* 1592. *(not of Hedw.) Turn. Musc. Hib. p.* 172. *t.* 15. *f.* 1. *Smith, Fl. Brit. p.* 1310. *Engl. Bot. t.* 2071. *Moug. et Nestl. n.* 520. *Hook. Fl. Scot. P. II. p.* 143. *Funck, Deutschl. Moose, t.* 43. *f.* 38. *Hobson, Brit. Mosses, v.* 1. *n.* 73. *Drummond, Musc. Scot. v.* 2. *n.* 65. *Brid. Meth. p.* 172. *Schwaegr. Suppl. v.* 1. *P. II. p.* 244. *Arn. Disp. Musc. p.* 63.

Hypnum pseudo-plumosum, H. Swartzii, alpinum, levisetum, asprellum, et polyrhizon? *Brid. Meth. (according to Arnott.)*

Hypnum alpinum. *Turn. Musc. Hib. p.* 192. *Smith, Fl. Brit. p.* 1380. *Engl. Bot. t.* 1496.

Hypnum capillaceum. *Funck, Deutschl. Moose, t.* 43. *f.* 39.

Hypnum flagellare. *Hedw. Sp. Musc. t.* 73. *f.* 1—3. *(not of Dicks.)*

HAB. Moist banks and rocks, not uncommon.

In this species the upper leaves are often secund, all of them of a glossy, generally deep yellow green. Hedwig's *H. plumosum*, (now called by authors *H. salebrosum*,) has striated leaves; and the whole plant so nearly resembles, (as Mr. Turner has observed,) *H. lutescens*, that we know of no character by which it may be well discriminated from it, except the smoothness of its fruitstalks. Specimens of Hedwig's *H. flagellare* perfectly accord with *H. plumosum*, and *H. alpinum* is not to be distinguished from it.

20. *H. pulchellum;* leaves loosely imbricated the upper ones subsecund all of them lanceolato-acuminate entire nerveless, capsules ovato-cylindrical nearly erect, lid conical. (TAB. XXV.)

Hypnum pulchellum. *Dicks. Pl. Crypt. Fasc.* 2. *t.* 5. *f.* 6. *(the leaf incorrectly represented with a nerve.) Turn. Musc. Hib. p.* 136. *Smith, Fl. Brit. p.* 1277. *Engl. Bot. t.* 2006. *Hook. Fl. Scot. P. II. p.* 143. *Funck, Deutschl. Moose, t.* 49. *f.* 66. *Drummond, Musc. Scot. v.* 1. *n.* 76.

Hypnum nitidulum. *Wahl.*

Leskea pulchella. *Hedw. Sp. Musc. t.* 55. *f.* 7—12.

HAB. Woods in alpine countries, and among rocks.

This is a small species, rarely exceeding an inch in length; the leaves standing out nearly horizontally on each side of the stem, on which account Wahlenberg has brought it into his

division with "shoots plane;" but then the upper leaves are subsecund, and from this circumstance, and the general habit of the plant, it assimilates very much with that variety of *H. cupressiforme* which, by the British Botanists, has been called *H. polyanthos*, (not *Leskea polyanthos*, Hedw.) and which is probably the same as the *H. incurvatum* of Schrader. From this, indeed, Schwaegrichen warns us to distinguish our plant:—"Differt," he says "a sequente *(H. incurvato)* operculo brevi, theca subcylindrica ascendente et colore pallido." Wahlenberg, on the other hand, says it is closely allied to *H. denticulatum*. This must not be confounded with the *H. pulchellum* of Hedwig, which is now called *H. strigosum*.

\+ \+ *Leaves striated.*

21. *H. rufescens;* leaves erecto-patent lanceolate acuminated entire striated faintly two nerved at the base, capsule ovate nearly erect, lid conical. (Tab. XXV.)

Hypnum rufescens. *Dicks. Pl. Crypt. Fasc.* 3. *t.* 8. *f.* 4. *Smith, Fl. Brit. p.* 1316. *Engl. Bot. t.* 2296. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 2. *n.* 61. *Drummond, Fl. Scot. v.* 2. *n.* 66. *Arn. Disp. Musc. p.* 64.

Leskea rufescens. *Moug. et Nestl. n.* 514. *Schwaegr. Suppl. v.* 1. *P. II. p.* 178. *t.* 88. *Funck, Deutschl. Moose, t.* 36. *f.* 13. *Brid. Meth. p.* 143.

Hab. Scotch alps, not rare.

Of this very beautiful moss the stems are from three to four or five inches long, erect, and the whole plant of a yellowish purple colour; sometimes very small, and then much resembling *H. incurvatum*. It is not uncommon in Scotland, and bearing fructification, according to Mr. Drummond.

22. *H. polyanthos;* leaves erecto-patent ovato-lanceolate remarkably acuminated minutely serrated at the point smooth obscurely two-nerved at the base, capsule ovato-cylindrical erect, lid conico-acuminate. (Suppl. Tab. V.)

Hypnum polyanthos. *Hooker in Drummond, Musc. Scot. v.* 2. *n.* 87. *Arn. Disp. Musc. p.* 69.

Leskea polyantha. *Hedw. St. Cr. v.* 4. *t.* 2. *Web. et Mohr. (not H. polyanthos Engl. Bot.) Brid. Meth. p.* 146. *Schwaegr. Suppl. v.* 1. *P. II. p.* 69.

Hab. On Apple-trees near Darlington.—*Mr. W. Back-*

house. Rocks and trees about Forfar, Scotland.—*Mr. Drummond.*

Stems forming closely entangled tufts, having numerous short, erect branches; leaves erecto-patent, slightly secund on the lowermost creeping shoots, ovate, or ovato-lanceolate, running out into a long, narrow acumen, which appears, under a slight magnifier, slightly serrulate, there are two very short indistinct nerves at the base. Fruitstalks about half an inch in length, capsule cylindrical, slightly swelling at the base, reddish brown.

We have mentioned under *H. cupressiforme*, that a slender variety of that moss has frequently been mistaken for the true *Leskea polyantha* of Hedwig, but we have never, ourselves, seen a British individual of this latter till Mr. W. Backhouse of Darlington, a most diligent investigator of the mosses of that neighbourhood, sent us specimens gathered on old apple-trees, in Nov. 1822, observing that he had visited the spot whence the specimens of *H. polyanthos* of *Engl. Bot.* were sent, and ascertained them to have the inclined capsules, and other marks of our var. *γ.* of *H. cupressiforme.* The distinctions are, that our plant has leaves pointing in all directions, broader below, more suddenly acuminated above, capsule quite erect, and decidedly the peristome of a *Leskea.* In general habit it resembles *H. sericeum*, but its smaller size, less glossy, duller green coloured leaves, without striæ, or evident nerve, are characters sufficiently distinctive.

23. *H. sericeum;* leaves erecto-patent lanceolate acuminated entire or slightly serrated nerve running to three-fourths of the length, capsule ovato-cylindrical erect, lid conical. (Tab. XXV.)

Hypnum sericeum. *Linn. Sp. Pl. p.* 1595. *Turn. Musc. Hib. p.* 138. *Smith, Fl. Brit. p.* 1282. *Engl. Bot. t.* 1445. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 1. *n.* 79. *Drummond, Musc. Scot. v.* 1. *n.* 79. *Arn. Disp. Musc. p.* 64.

Leskea sericea. *Hedw. St. Cr. v.* 4. *t.* 17. *Moug. et Nestl. n.* 25. *Schwaegr. Suppl. v.* 1. *P. II. p.* 178. *Brid. Meth. p.* 144. *Funck, Deutschl. Moose, t.* 36. *f.* 12.—*Dill. Musc. t.* 42. *f.* 9.

Hab. On trunks of trees, walls and rocks.

Stems creeping; branches numerous, erect.

24. *H. salebrosum;* leaves erecto-patent lanceolate acuminated into a waved hair-like scarcely serrulate point striated the nerve disappearing above the middle, capsule ovate cernuous, fruitstalks smooth, lid conico-acuminate. (SUPPL. TAB. V.)

Hypnum salebrosum. *Hoffm. Fl. Germ. v.* 2. *p.* 74. *Schwaegr. Suppl. v.* 1. *P. II. p.* 237. *Funck, Deutschl. Moose, t.* 42. *f.* 31. *Drummond, Musc. Scot. v.* 2. *n.* 68. *Grev. Fl. Crypt. Scot. t.* 184.

Hypnum plumosum. *Hedw. St. Cr. v.* 4. *t.* 15. *(excl. Syn.)*

HAB. Cotterall Wood near Manchester.—*Mr. Hobson.*

Near the Loch of Forfar, Scotland.—*Mr. Drummond.*

We took notice of this plant in our first edition under *H. lutescens*, and *H. plumosum*, but, judging as we did then from imperfect specimens, we were unable to satisfy ourselves of its real characters. Mr. Hobson, its original discoverer in this country, has since found it plentifully in the above habitat, and we find it to accord in every respect with the Hedwigian figure and description. It is remarkable for its pale green colour, and thin flaccid leaves, which are generally more patent, and tapering into a more hair-like and waved point than any of its affinities.

25. *H. lutescens;* leaves erecto-patent lanceolate acuminated entire striated the nerve disappearing below the point, capsule ovate cernuous, fruitstalks rough, lid conico-acuminate. (TAB. XXV.)

Hypnum lutescens. *Huds. Angl. ed.* 1. *p.* 421. *Hedw. St. Cr. v.* 4. *t.* 16. *Turn. Musc. Hib. p.* 174. *Smith, Fl. Brit. p.* 1311. *Engl. Bot. t.* 1301. *Moug. et Nestl. n.* 334. *Funck, Deutschl. Moose, t.* 42. *f.* 32. *Hook. Fl. Scot. P. II. p.* 143. *Hobson, Brit. Mosses, v.* 2. *n.* 62. *Drummond, Musc. Scot. v.* 1. *n.* 80. *Brid. Meth. p.* 172. *Schwaegr. Suppl. v.* 1. *P. II. p.* 237. *Arn. Disp. Musc. p.* 64.—*Dill. Musc. t.* 48. *f.* 60.

HAB. Banks and stems of trees, and bushes near the ground, common.

Stems much branched, branches spreading. Leaves sometimes slightly serrulated under a microscope, of a bright yellow-green colour. We have already observed how nearly this species is allied to *H. salebrosum* of Mohr, (*H. plumosum*, Hedw.) insomuch that they who have considered them distinct, can discover no other character by which they may be known than the smooth fruitstalk and somewhat shorter lid of

the latter. The inner peristome has been figured by Mr. Sowerby as that of a *Leskea;* but in all the specimens that we have examined, there may be observed short, filiform processes between each segment of the inner peristome which constitute it a true *Hypnum*.

26. *H. nitens;* leaves erecto-patent lanceolato-subulate acuminated nearly entire striated the nerve running nearly to the summit, capsule oblongo-ovate curved cernuous, fruitstalks smooth, lid conical. (Tab. XXV.)

Hypnum nitens. *Schreb. Fl. Lips. p.* 92. *Hedw.—Smith, Fl. Brit. p.* 1316. *Engl. Bot. t.* 1646. *Hook. Fl. Scot. P. II. p.* 144. *Drummond, Musc. Scot. v.* 2. *n.* 67. *Hobson, Brit. Mosses, v.* 2. *n.* 63. *Schwaegr. Suppl. v.* 1. *P. II. p.* 291. *Brid. Meth. p.* 159. *Arn. Disp. Musc. p.* 64. *Funck, Deutschl. Moose, t.* 40. *f.* 21. *Moug. et Nestl. n.* 517.—*Dill. Musc. t.* 39. *f.* 37.

Hab. Bogs in Scotland.—*Mr. Dickson.* Pentland Hills.—*Mr. Maughan.* Kinrosshire.—*Mr. Arnott.* Near Acle, Norfolk.—*Mr. Turner.* Marshy ground between Copgrove and the river Ure, Yorkshire.—*Rev. James Dalton.*

Dillenius did not know this fine moss as British. We are indebted for the discovery of it to Mr. Dickson, and to Mr. Dalton for specimens with perfect capsules. It approaches very near to the last mentioned species, but differs by its larger size, more upright and pinnate mode of growth, orange brown colour, shorter lid, and longer capsule.

27. *H. albicans;* leaves erecto-patent ovato-lanceolate acuminated striated entire the nerve reaching half way up, capsules ovate cernuous, fruitstalks smooth, lid conical. (Tab. XXV.)

Hypnum albicans. *Neck. Meth. Musc. p.* 180. *Hedw. St. Cr. v.* 4. *t.* 5. *Turn. Musc. Hib. p.* 171. *Smith, Fl. Brit. p.* 1309. *Engl. Bot. t.* 1300. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 2. *n.* 64. *Funck, Deutschl. Moose, t.* 39. *f.* 11. *Schwaegr. Suppl. v.* 1. *P. II. p.* 114. *Brid. Meth. p.* 174. *Drummond, Musc. Scot. v.* 2. *n.* 69. *Arn. Disp. Musc. p.* 64.—*Dill. Musc. t.* 42. *f.* 63.

Hab. Hedge banks, and upon the ground, especially in a light sandy soil, common.

This plant is of a much paler colour, and less branched than *H. lutescens*, which it resembles in some points; its leaves, how-

ever, are longer, more acuminate, softer and more patent. We must confess that the characters of these two mosses, and *H. nitens*, and *H. salebrosum*, approximate so nearly as to render the discrimination between them a most difficult task; nor should we be surprised to find that future observations prove them to be varieties of the same species produced by different circumstances of growth.

* * *Leaves serrated.*

† *Stems below bare of leaves.*

28. *H. alopecurum;* stems erect below simple and naked fascicled above, leaves concave ovate elliptical acute serrated the nerve running nearly to the point margin reflexed, capsule ovate cernuous, lid rostrate. (Tab. XXV.)

Hypnum alopecurum. *Linn. Sp. Pl. p.* 1594. *Turn. Musc. Hib. p.* 163. *Smith, Fl. Brit. p.* 1132. *Engl. Bot. t.* 1182. *Moug. et Nestl. n.* 144. *Funck, Deutschl. Moose, t.* 45. *f.* 51. *Brid. Meth. p.* 164. *Schwaegr. Suppl. v.* 1. *P. II. p.* 265. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 1. *n.* 77. *Drummond, Musc. Scot. v.* 1. *n.* 86. *Arn. Disp. Musc. p.* 59.—*Dill. Musc. t.* 41. *f.* 49.

Hab. Woods and shaded banks, common.

This and the following, which are among the largest of our *Hypna*, resemble several species from New Holland in their upright stems which are almost naked below, and thickly fascicled with branches at the summit. A variety of this plant, growing in running water, departs from its common appearance by being branched from the very base, with the branches more elongated, and having the leaves more closely set and shorter.

29. *H. dendroides;* stems erect below simple and naked fascicled above, leaves ovate often more or less lanceolate serrated at the point the nerve reaching nearly to the summit, capsule ovato-cylindrical, lid rostrate. (Tab. XXV.)

Hypnum dendroides. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 138. *Smith, Fl. Brit. p.* 1283. *Engl. Bot. t.* 1565. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 1. *n.* 78. *Drummond, Musc. Scot. v.* 1. *n.* 85. *Arn. Disp. Musc. p.* 59.

Leskea dendroides. *Hedw. Sp. Musc.*—*Wahl.*

Neckera dendroides. *Swartz.*

Climacium dendroides. *Mohr.—Moug. et Nestl. n.* 138. *Schwaegr. Suppl. v.* 1. *P. II. p.* 141. *t.* 81. *Funck, Deutschl. Moose, t.* 33. *f.* 1. *—Dill. Musc. t.* 40. *f.* 48.

HAB. In woods; not very frequent in fructification, but found in that state near Manchester, by *Mr. Hobson.* About Oxford.—*Mr. Oglander.* And in several subalpine spots in Scotland.

The columella of this moss is protruded, and reaches the top of the lid, which, when the capsules are ripe, and in a dry state of the atmosphere, it raises up, turning in a spiral manner; and then, perhaps, permitting the discharge of the seeds. If in this state, moisture be applied to the mouth of the capsule, the lid on the top of the columella will descend, as this last performs a spiral volution, and the capsule becomes completely closed again. The segments of the interior peristome being cleft at the base, has induced Weber and Mohr to make a distinct genus of this moss.

† † *Stems below leafy.*

+ *Capsules erect.*

30. *H. curvatum;* branches fascicled curved, leaves ovato-elliptical concave serrated at the points nerve disappearing beyond the middle, capsule ovate erect, lid rostrate. (TAB. XXV.)

Hypnum curvatum. *Swartz, Musc. Suec. p.* 64. *Turn. Musc. Hib. p.* 139. *Smith, Fl. Brit. p.* 1284. *Engl. Bot. t.* 1566. *Moug. et Nestl. n.* 331. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 1. *n.* 75. *Drummond, Musc. Scot. v.* 1. *n.* 87. *Funck, Deutschl. Moose, t.* 46. *f.* 52. *Schwaegr. Suppl. v.* 1. *P. II. p.* 267. *Arn. Disp. Musc. p.* 64.

Hypnum myosuroides. *Hedw. St. Cr. v.* 4. *t.* 8.—*Dill. Musc. t.* 41. *f.* 50.

Hypnum myurum. *Brid. Meth. p.* 184.

HAB. On trees and rocks.

The nerve is, as Mohr has justly observed, sometimes forked. In habit it somewhat resembles the two last species, but is considerably smaller, and the stems are leafy throughout.

31. *H. myosuroides;* branches fascicled curved, leaves lanceolato-acuminate serrated margins reflexed at the base their nerve

disappearing near the middle, capsule ovato-cylindrical erect, lid rostrate. (TAB. XXV.)

Hypnum myosuroides. *Linn. Sp. Pl. p.* 1596. *(not of Hedw.) Turn. Musc. Hib. p.* 140. *Smith, Fl. Brit. p.* 1285. *Engl. Bot. t.* 1567. *Moug. et Nestl. n.* 330. *Funck, Deutschl. Moose, t.* 46. *f.* 53. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 1. *n.* 76. *Drummond, Musc. Scot. v.* 1. *n.* 88. *Brid. Meth. p.* 165. *Schwaegr. Suppl. v.* 1. *P. II. p.* 267. *Arn. Disp. Musc. p.* 64.—*Dill. Musc. t.* 41. *f.* 51.

HAB. On trunks of trees and rocks.

This can only be confounded with the preceding species, but its more slender habit, its leaves more acuminated, less concave, with their shorter nerve, reflexed margins, serrated nearly their whole length, will ever keep it distinct.

+ + *Capsules cernuous.*

§ *Stems bi-tripinnate.*

32. *H. splendens;* stems tripinnate, leaves ovate with a suddenly acuminated serrated point concave faintly two-nerved at the base margin below recurved, capsule ovate cernuous, lid rostrate. (TAB. XXV.)

Hypnum splendens. *Hedw. Sp. Musc. t.* 67. *f.* 7—9. *Turn. Musc. Hib. p.* 156. *Smith, Fl. Brit. p.* 1295. *Engl. Bot. t.* 1424. *Moug. et Nestl. n.* 42. *Funck, Deutschl. Moose, t.* 42. *f.* 3. *Hook. Fl. Scot. P. II. p.* 144. *Hobson, Brit. Mosses, v.* 1. *n.* 80. *Drummond, Musc. Scot. v.* 1. *n.* 90. *Brid. Meth. p.* 163. *Schwaegr. Suppl. v.* 1. *P. II. p.* 237. *Arn. Disp. Musc. p.* 64.

Hypnum parietinum. *Swartz.—Dill. Musc. t.* 35. *f.* 13.

HAB. Heaths and hedgebanks in woods.

Whole plant glossy, whence its specific name. It has much affinity with the *H. umbratum* of Ehrh. and Hedw. (but not of British authors) in its ramification. This last, although so common on the Continent, has never been found in Britain, and may readily enough be distinguished from our present plant by its cordato-triangular foliage and conical lid.

33. *H. proliferum;* stems tripinnate, leaves serrated papillose on the back the cauline ones cordato-acuminate striated with a nerve running nearly to the point, those of the branches

more ovate with a single or double nerve at the base, lid conico-rostrate. (TAB. XXV.)

Hypnum proliferum. *Linn. Sp. Pl. p.* 1590. *Turn. Musc. Hib. p.* 157. *Smith, Fl. Brit. p.* 1297. *Engl. Bot. t.* 1494. *Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 81. *Drummond, Musc. Scot. v.* 1. *n.* 91. *Brid. Meth. p.* 163. *Arn. Disp. Musc. p.* 64.

Hypnum tamariscinum. *Hedw. Sp. Musc. p.* 261. *t.* 67. *f.* 1—5. *Schwaegr. Suppl. v.* 1. *P. II. p.* 236. *Brid. Meth. p.* 164.

Hypnum recognitum. *Hedw. St. Cr. v.* 4. *t.* 35. *Smith, Fl. Brit. p.* 1298. *Engl. Bot. t.* 1495.

Hypnum delicatulum. *Hedw. St. Cr. v.* 4. *t.* 33. *Schwaegr. Suppl. v.* 1. *P. II. p.* 236.

Hypnum fuciforme. *Brid. Meth. p.* 163.

Hypnum parietinum. *Willd.—Dill. Musc. t.* 35. *f.* 14. *and* 83. *f.* 6.

HAB. Woods and banks in heathy places, abundant.

Stems reddish, leaves yellowish-green, dark, and opaque. This moss has been found in every part of Europe; as well as in Jamaica, New Holland, and on the mountains of Nepaul.*

* We are sensible of the errors in the synonym of this plant in the first edition of our Muscologia, which Sir James Smith has corrected in his "*Remarks upon Hypnum recognitum*," &c. published in the Thirteenth volume of the Transactions of the Linnæan Society, p. 459. But we cannot so readily subscribe to the correctness of the observation on *H. recognitum* there made:—"This moss, being, as I trust, clearly defined in the *Flora Britannica*, and figured in *English Botany, t.* 1495, I am somewhat surprised at the obscurity in which it is involved in the *Muscologia Britannica*, where it is not allowed the rank of a species, or even of a variety, being altogether confounded with the common *Hypnum proliferum*. Neither are the above works, where alone it has been hitherto announced as a British plant, cited at all!"

If, indeed, we could for a moment bring ourselves to believe that the *H. recognitum* had characters that would entitle it to rank as a species, or even a permanent variety, we should think that by omitting it we had obscured the subject; and if our valued friend had only given himself the trouble to refer to our account of *Hypnum proliferum*, published in the new edition of the *Flora Londinensis*, he would have assured himself that we had by no means neglected references to his works, (of whose well merited fame none can be more sensible than ourselves,) and farther, that we had given the subject the attention it deserved, although we have come to different conclusions from himself. Those remarks, too, were published long before our *Muscologia Britannica*, and we shall here subjoin some of them:—

"This species is, according to Sir James Smith, to whom we must ever

34. *H. prælongum;* stems subbipinnate, leaves distantly placed patent cordate or ovate acuminated serrated the nerve disappearing below the summit, capsule ovate cernuous, lid rostrate. (TAB. XXV.)

Hypnum prælongum. *Linn. Sp. Pl. p.* 1591. *Hedw. St. Cr. v.* 4. *t.* 29. *Turn. Musc. Hib. p.* 160. *Moug. et Nestl. n.* 422. *Smith, Fl. Brit. p.* 1299. *Engl. Bot. t.* 2035. *Hook. Fl. Scot. P. II.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 82. *Drummond, Musc. Scot. v.* 1. *n.* 89. *Funck, Deutschl. Moose, t.* 48. *f.* 60. *Schwaegr. Suppl. v.* 1. *P. II. p.* 277. *Brid. Meth. p.* 156. *Arn. Disp. Musc. p.* 64.

look as the highest authority in such cases, the true *Hypnum proliferum* of Linnæus, although confounded by him with the *Hypnum splendens* of Hedwig. As a further proof of the correctness of Sir James Smith's assertion, it may be remarked, that Linnæus refers to a figure in Dill. (*t.* 35. *f.* 14.) which it is impossible should be mistaken. We cannot, therefore, but wonder at what Wahlenberg has said in his *Flora Lapponica*, under his *Hypnum parietinum*, (Schreberi, Hedw.): "*H. Tamariscinum*, Hedw. *(our prolif.)* in Suecia vix crescere videtur, itaque Linnæo incognitum fuit; nec dubitandum quin insequens (*H. splendens*, Hedw.) ejus *H. proliferum* constituerit." p. 373. Swartz has, nevertheless, given it a place in *Musc. Suecica.*"

"Authentic specimens of *H. recognitum* in Mr. Turner's valuable Herbarium, have satisfied me that Hedwig's plant, published under that name in the *Stirpes*, differs in no particular from *H. proliferum*. It is true the specimens which I examined did not possess their opercula, in which a character is said to exist; but in this particular Mohr will set us right, for he had the opportunity of seeing perfect specimens of *H. recognitum*, and says "nec levissimum discrimen est inter hæcce specimina et ea *H. tamarisc.* Operculum præ primis minime, prout Hedw. deliniavit, conicum, sed reapse ut in *H. tamarisc.* rostratum. Procul omni dubio itaque posthac *H. H. recogn.* et *tamarisc.* Hedw. unam tantum speciem sistunt." We must add, too, the opinion of the learned author of the *Musc. Hib.* in confirmation of our own:—"Statura minore operculoque conico differre videtur *H. recognitum* Hedw. muscis Britannicis a cel. Smithio nuper ascriptum, sed, pace Hedwigii, dubitare ut specie vere discrepet." Sir James Smith, indeed, seems to have satisfied himself of the distinctness of his *H. recognitum*, founding that distinction almost entirely upon the shape of the lid; a circumstance which, we have already observed in our description, is somewhat variable, and we have seen it to be so in different capsules on the same individual plant, although not to that degree that is expressed in the figures in *Engl. Bot.* of the plants in question. We have neither seen in any specimens the *operculum* so short as in the *recognitum* represented in *Engl. Bot.* or so long as in the *proliferum* of the same work. We may add, that the *operculum* in many mosses, especially if the capsules be not quite ripe, is shorter in the dried specimen of the plant than when the vessels are filled

Hypnum Stokesii. *Turn. Musc. Hib. p.* 159. *t.* 15. *f.* 2. *Smith, Fl. Brit. p.* 1300. *Engl. Bot. t.* 2036.

Hypnum Swartzii. *Turn. Musc. Hib. p.* 151. *t.* 14. *f.* 1 *and* 2. *Smith, Fl. Brit. p.* 1293. *Engl. Bot. t.* 2034.

Hypnum atrovirens. *Swartz.*

Hypnum strigosum. *Funck, Deutschl. Moose, t.* 46. *f.* 54.—*Dill. Musc. t.* 36. *f.* 15.

Hypnum speciosum. *Brid. Meth. p.* 156.

with juices in their fresh state; and this will account for some difference. The leaves are the same in both, though neither of them is well figured in *Engl. Bot.*, nor is either of them three-nerved as they are there said to be."

"The next species to be considered is the *Hypnum delicatulum* of Hedwig; a native, indeed, of Pennsylvania; yet according to specimens we have received both from Dr. Muhlenberg and Professor Richard, differing only in its smaller size from our *H. proliferum*. An excellent figure of this is given in Dillenius, (*t.* 83. *f.* 6.) The differences noted by Hedwig are of small moment; and what he says of the larger segments of the internal peristome being perforated, is a circumstance that varies in different individuals. In *H. proliferum* they are sometimes entire, and sometimes perforated. Linnæus, in speaking of *H. delicatulum*, remarks "Precedenti *(H. prolif.)* simillimum, sed longe tenerius et forte sola varietas."

In addition to what in the above extract refers to *H. recognitum*, we need say no more, than, that since these remarks were published, we have seen Sir James Smith's own specimens, and are only the more confirmed in our opinion that they are merely varieties of *H. proliferum*, and such as would be likely to arise from the situation of the plant, "clothing the surface of *shady* broken rocks, and filling up many of their *interstices*, in loose patches or tufts."—Smith says *H. delicatulum* of Hedwig is not the *recognitum* of the same author; but Schwaegrichen, the possessor of the Hedwigian Herbarium, and the steady follower in the steps of his great master, unites the two in his late supplementary volume, and adds "operculi rostrum magis vel minus acuminatum in utroque."

Some reply is still required to another passage in the same Memoir by Sir James Smith, in allusion to our not having in our first edition referred to the *Flora Britannica* "which might, perhaps, according to general usage, and not without advantage, have been quoted in the Muscologia." To this we answer, that since it was a professed object with us to bring the volume to as small a compass as possible, (see Introduction to the first edition, p. vii. at bottom,) and since the *English Botany* contained the latest opinions of the author upon almost every species, accompanied by figures, we did deem it sufficient to quote that alone. We omitted every synonym that we thought unnecessary, even our own labours in the *Flora Londinensis*, and for the same reason.

HAB. Moist shady banks, and on trunks of trees, especially on such as are in a state of decay.

Mohr has justly observed how extremely variable is the mode of growth of this plant, nor have we brought together so many synonyms without a cautious examination of authentic specimens. In mountainous marshy situations the variety named *Stokesii*, with closely set, bipinnate branches, occurs; and in wet hollows in banks is found the variety *Swartzii*, which is well represented in the magnified figure of Turner's *Musc. Hib. t.* 14. *f.* 2. 6.— It is characterized by its slender straggling branches, narrow and black-green foliage.

§ § *Stems pinnate, or irregularly branched.*

35. *H. flagellare;* stems pinnate (or irregularly bipinnate), leaves thickly set cordato-acuminate serrated very faintly two-nerved at the base, capsule oblong cernuous, lid conical. (TAB. XXV.)

Hypnum flagellare. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 12. *Smith, Fl. Brit. p.* 1322. *(not of Hedw.) Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 2. *n.* 65. *Brid. Meth. p.* 184. *Arn. Disp. Musc. p.* 64.

Hypnum umbratum. *Engl. Bot. t.* 2565. *Turn. Musc. Hib. p.* 158. *(not of Hedw.)*

HAB. Rocks in alpine countries. Plentiful in Ireland.

By means of authentic specimens from Mr. Dickson of his *H. flagellare*, we have ascertained that it is the *H. umbratum* of Turner and Smith, and not of Hedwig, which differs in its ramification, its striated, much more strongly serrated leaves, and its longer divided nerve, approaching very nearly to *H. triquetrum;* especially that variety of it called *brevirostre* by Ehrhart. Hedwig's *H. flagellare* is *H. plumosum.*

36. *H. abietinum;* stems pinnate, leaves serrated papillose on the back the margins reflexed the nerve running nearly to the point the cauline ones cordato-acuminate those of the branches cordato-acute, capsules cylindrical inclined, lid conical. (TAB. XXV.)

Hypnum abietinum. *Linn. Sp. Pl. p.* 1591. *Hedw. St. Cr. v.* 4. *t.* 32. *Turn. Musc. Hib. p.* 162. *Smith, Fl. Brit. p.* 1300. *Engl.*

Bot. t. 2037. *Moug. et Nestl. n.* 226. *Funck, Deutschl. Moose, t.* 41. *f.* 25. *Drummond, Musc. Scot. v.* 2. *n.* 70. *Brid. Meth. p.* 163. *Schwaegr. Suppl. v.* 1. *P. II. p.* 232. *Arn. Disp. Musc. p.* 64.—*Dill. Musc. t.* 35. *f.* 17.

Hypnum Scitum. *Brid. Meth. p.* 163.

HAB. On the ground in mountainous, and principally calcareous soils, rare in Scotland; found on the sands of Barrie by *Mr. Drummond.*

Swartz's specimens are very different from our own in having a remarkable furrow in the leaf as seen from above, and consequently a projecting keel beneath; nor is there any nerve. We are sorry not to have had the opportunity of ascertaining whether the Linnæan species be the same. Ours coincides precisely with what we have received from various Continental Botanists. The fruit is extremely rare, and never, that we have heard of, produced in this country.

37. *H. Blandovii;* stems pinnate, leaves serrated smooth on the back margins reflexed the cauline ones cordato-acute with a short nerve, those of the branches ovato-acuminate with the nerve disappearing beyond the middle, capsules cylindrical inclined, lid conical. (TAB. XXV.)

Hypnum Blandovii. *Web. et Mohr. Fl. Crypt. Germ. p.* 332. *Sturm. Deutschl. Fl. (with a fig.) Schwaegr. Suppl. v.* 3. *p.* 158. *t.* 142. *Funck, Deutschl. Moose, t.* 41. *f.* 26. *Arn. Disp. Musc. p.* 64. *Brid. Meth. p.* 163.

HAB. Rocks in subalpine countries.

For this interesting addition to the British Mosses we are indebted to Mr. Joseph Woods, who found it on the rocks at Tunbridge. Mohr, who first distinguished it from the preceding species, says very justly, "facies *H. abietini,* a quo tamen differt ut *H. splendens* ab *H. tamariscino.*"

38. *H. piliferum;* stems somewhat pinnate, leaves ovate with a long narrow acumination serrated the nerve disappearing below the middle, capsule cernuous, lid conico-acuminate. (TAB. XXV.)

Hypnum piliferum. *Schreb. Fl. Lips. p.* 91. *Hedw. St. Cr. v.* 4. *t.* 14. *Turn. Musc. Hib. p.* 178. *Smith, Fl. Brit. p.* 1319. *Engl. Bot. t.* 1516. *Moug. et Nestl. n.* 624. *Funck, Deutschl. Moose, t.* 43. *f.* 35. *Hook. Fl. Scot. P. II. p.* 145. *Drummond, Musc. Scot. v.* 2.

n. 71. *Schwaegr. Suppl. v.* 1. *P. II. p.* 239. *Brid. Meth. p.* 173. *Arn. Disp. Musc. p.* 65.

HAB. Banks; rare in fructification. In fruit at Auchindenny, near Edinburgh.—*Mr. Arnott.*

This is a distinctly marked plant in its exactly ovate stem leaves, with a long point so suddenly acuminated, that they appear, especially when dry, to be hair-pointed. Those of the stem terminate more gradually, and scarcely justify the specific name.

A remarkable variety of this moss has been found on the rocks at the summit of Ben Lawers by Mr. Arnott; seeming to connect the species with Schwaegrichen's *H. cirrhosum.*

39. *H. blandum;* stems somewhat pinnated, leaves closely imbricated nearly erect ovate concave acute without striæ serrulated the nerve disappearing below the point, fruitstalks rough, lid conico-acuminate. (SUPPL. TAB. V.)

Hypnum blandum. *Lyell. MSS.—Hook. in Fl. Lond. New Series. cum ic.—Arn. Disp. Musc. p.* 60.

HAB. On a bank in Cadnam Lane, New Forest, Hampshire.—*C. Lyell, Esq.*

We know of no other station for this pretty moss than that above given. It is allied on the one hand, to *Hypnum murale,* on the other, to *H. rutabulum;* but sufficiently distinct from both in the characters above given.

40. *H. rutabulum;* stems variously branched, leaves patent ovate acuminated serrated at the points striated their nerve reaching half way, capsule ovate cernuous, fruitstalks rough, lid conical. (TAB. XXVI.)

Hypnum rutabulum. *Linn. Sp. Pl. p.* 1590. *Hedw. St. Cr. v.* 4. *t.* 12. *Turn. Musc. Hib. p.* 179. *Smith, Fl. Brit. p.* 1320. *Moug. et Nestl. n.* 143. *Funck, Deutschl. Moose, t.* 44. *f.* 40. *Schwaegr. Suppl. v.* 1. *P. II. p.* 244. *Brid. Meth. p.* 173. *Hook. Fl. Scot. P II. p.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 86. *Drummond, Musc. Scot. v.* 2. *n.* 72. *Arn. Disp. Musc. p.* 65.

Hypnum flavescens, chrysostomum, hians, and graminicolor? *of Brid. Meth.*

Hypnum brevirostre. *Engl. Bot. t.* 1647. *(not of Ehrh.)*

Hypnum crenulatum. *Engl. Bot. t.* 1261.

Hypnum Starkii. *Funck, Deutschl. Moose, t.* 44. *f.* 41.—*Dill. Musc. t.* 38. *f.* 29.

HAB. On trees and on banks, extremely common.

H. brevirostre, a name previously given by Ehrhart to a variety of *H. triquetrum*, can never be applied to the present species.

41. *H. velutinum*; stems variously branched, leaves erecto-patent ovate often approaching to lanceolate acuminated serrated striated their nerve reaching half way, capsule ovate cernuous, fruitstalk rough, lid conical. (TAB. XXV.)

Hypnum velutinum. *Linn. Sp. Pl. p.* 1595. *Hedw. St. Cr. v.* 4. *t.* 27. *Turn. Musc. Hib. p.* 167. *Smith, Fl. Brit. p.* 1305. *Engl. Bot. t.* 2421. *Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 85. *Drummond, Musc. Scot. v.* 1. *n.* 94. *Schwaegr. Suppl. v.* 1. *P. II. p.* 253. *Brid. Meth. p.* 169. *Arn. Disp. Musc. p.* 65.

Hypnum intricatum. *Funck, Deutschl. Moose, t.* 44. *f.* 45. *Schwaegr. Suppl. v.* 1. *P. II. p.* 233. *Brid. Meth. p.* 170.

Hypnum Teesdalii. *Dicks?—Dill. Musc. t.* 42. *f.* 61.

HAB. Woods and hedgebanks, common.

The character here given will show how closely this species is allied to the preceding; and, indeed, except in its smaller size, somewhat narrower leaves, and their more upright direction, we can find no point of distinction. So also is it with the *H. intricatum* of authors, the specimens that we have seen are smaller than our *H. velutinum*, and the leaves even less broad. Hedwig mentions a difference in the annulus, which we have not been able to verify.

42. *H. ruscifolium*; stems variously branched, leaves loosely imbricated subpatent broadly ovate acute serrated concave their nerve reaching nearly to the summit, capsule ovate cernuous, lid rostrate. (TAB. XXVI.)

Hypnum ruscifolium. *Neck. Meth. Musc.—Turn. Musc. Hib. p.* 153. *Smith, Fl. Brit. p.* 1290. *Engl. Bot. t.* 1275. *Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 84. *Drummond, Musc. Scot. v.* 1. *n.* 92. *Arn. Disp. Musc. p.* 65.

Hypnum riparioides. *Hedw. St. Cr. v.* 4. *t.* 4. *Moug. et Nestl. n.* 427. *Funck, Deutschl. Moose, t.* 38. *f.* 5. *Schwaegr. Suppl. v.* 1. *P. II. p.* 195.

Hypnum prolixum. *Dicks.*

Hypnum atlanticum. *Desfont. Fl. Atlant. and Brid. Meth. p.* 174. *together with* H. rusciforme, inundatum, *and* fontium, *of the same author.—Dill. Musc. t.* 38. *f.* 31 *and* 32.

HAB. Upon wood and stones in pools and rivers.

The stems often exceed a span in length, and the leaves, in certain situations, attain a greater size than in any British species of *Hypnum*.

43. *H. striatum;* stems variously branched, leaves patent cordato-acuminate serrated striated their nerve reaching beyond the middle, capsule oblongo-ovate cernuous, fruitstalks smooth, lid rostrate. (TAB. XXVI.)

Hypnum striatum. *Schreb. Fl. Lips. p.* 91. *Hedw. St. Cr. v.* 4. *t.* 13. *Turn. Musc. Hib. p.* 180. *Smith, Fl. Brit. p.* 1321. *Engl. Bot. t.* 1648. *Moug. et Nestl. n.* 142. *Funck, Deutschl. Moose, t.* 40. *f.* 34. *Schwaegr. Suppl. v.* 1. *P. II. p.* 238. *Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 1. *n.* 87. *Drummond, Musc. Scot. v.* 1. *n.* 84. *Arn. Disp. Musc. p.* 65.

Hypnum longirostrum. *Ehrh. Brid. Meth. p.* 174.—*Dill. Musc. t.* 38. *f.* 30.

HAB. Woods and on shady banks, common.

This species comes near to *H. rutabulum;* but is a larger and more robust plant, with leaves more patent, broader, and more decidedly striated, with a shorter point, and longer nerve; the fruitstalks are smooth, and the lid rostrate.

44. *H. confertum;* stems variously branched, leaves erecto-patent ovate acuminated concave serrated their nerve reaching half way, capsule ovate cernuous, fruitstalk smooth, lid rostrate. (TAB. XXVI.)

Hypnum confertum. *Dicks. Pl. Cr. Fasc.* 4. *t.* 11. *f.* 4. *Smith, Fl. Brit. p.* 1304. *Engl. Bot. t.* 2407. *Schwaegr. Suppl. v.* 1. *P. II. p.* 199. *t.* 90. *Brid. Meth. p.* 157. *Hook. Fl. Scot. P. II. p.* 145. *Hobson, Brit. Mosses, v.* 2. *n.* 67. *Drummond, Musc. Scot. v.* 2. *n.* 73. *Funck, Deutschl. Moose, t.* 38. *f.* 8. *Arn. Disp. Musc. p.* 65.

Hypnum serrulatum. *Hedw. Sp. Musc. t.* 60. *Engl. Bot. t.* 1262. *Brid. Meth. p.* 154. *together with* orthorhynchum, lætevirens, planiusculum, Schleicheri, intertextum, Megapolitanum? *of the same author.*

HAB. Trunks of trees, old rails, and on banks.

We have compared this with the Pennsylvanian *H. serrulatum* of Hedwig, and cannot even find the trifling difference which Mohr has noticed. A small variety, growing on trees, has the leaves occasionally subsecund.

B. *Leaves squarrose.*

45. *H. cuspidatum;* leaves loosely set ovate concave nerveless

entire the lower ones squarrose those at the summit closely imbricated into a cuspidate point, capsule oblong curved cernuous, lid conical. (TAB. XXVI.)

Hypnum cuspidatum. *Linn. Sp. Pl. p.* 1595. *Turn. Musc. Hib. p.* 177. *(excl. var. β.) Smith, Fl. Brit. p.* 1317. *Engl. Bot. t.* 2407. *Moug. et Nestl. n.* 227. *Funck, Deutschl. Moose, t.* 41. *f.* 22. *Schwaegr. Suppl. v.* 1. *P. II. p.* 228. *Brid. Meth. p.* 159. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 1. *n.* 83. *Drummond, Musc. Scot. v.* 2. *n.* 74. *Arn. Disp. Musc. p.* 66.—*Dill. Musc. t.* 39. *f.* 34.

Hypnum flexile. *Brid. Meth. p.* 158.

HAB. Bogs.

The habit of this plant is very similar to that of *H. cordifolium*, a dark variety of which Mr. Turner has made his var. β. The present moss is easily known by its sharp cuspidate extremities; it grows to a great size in water.

46. *H. cordifolium;* leaves loosely set squarrose cordato-ovate obtuse concave entire their nerve running very nearly to the point, capsule oblong curved cernuous, lid conical. (TAB. XXVI.)

Hypnum cordifolium. *Hedw. St. Cr. v.* 4. *t.* 37. *Smith, Fl. Brit. p.* 1318. *Engl. Bot. t.* 1447. *Moug. et Nestl. n.* 518. *Funck, Deutschl. Moose, t.* 41. *f.* 23. *Schwaegr. Suppl. v.* 1. *P. II. p.* 229. *Brid. Meth. p.* 159. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 2. *n.* 68. *Drummond, Musc. Scot. v.* 2. *n.* 75. *Arn. Disp. Musc. p.* 66.

Hypnum cuspidatum. β. *Turn. Musc. Hib. p.* 177.

Hypnum squarrulosum. *Brid.*

HAB. Bogs.

A purple variety of this moss, generally barren, is found in alpine situations, frequently assuming a fasciculated appearance, with the tops of the branches having the leaves convolute; and if the nerve of the leaf be not accurately observed, it may be taken for *H. cuspidatum*. Hence it is considered as the var. β. of that species in the *Musc. Hib.*

47. *H. polymorphum;* leaves loosely set squarrose cordate much acuminated entire their nerve disappearing half way up, capsule oblongo-ovate curved cernuous, lid conical. (TAB. XXVI.)

Hypnum polymorphum. *Hedw. Sp. Musc. t.* 66. *(nerve omitted.)*

Hypnum chrysophyllum. *Brid. Musc. v.* 2. *t.* 2. *f.* 2. *Mohr.—Funck, Deutschl. Moose, t.* 4. *f.* 58. *Moug. et Nestl. n.* 731.

HAB. Limestone rocks in Ireland. Chalky downs in Sussex.—*Mr. Borrer.* Near Edinburgh.—*Dr. Greville.*

Without authentic specimens we cannot feel ourselves competent to decide whether Mohr's *H. chrysophyllum* be our plant; though, if we were to judge from his description, we could have but little doubt of their identity. Specimens sent by Mohr, probably through a mistake, under the last mentioned name, belong truly to *H. stellatum.* He has himself cautioned us, that the two plants only differ in the presence or absence of the nerve. We have compared specimens of Hedwig's *H. polymorphum*, and find them to accord precisely with our plant; and hence we are enabled to detect the error of the omission of the nerve in the figure above cited.*

48. *H. stellatum;* leaves loosely set squarrose cordate much acuminated entire nerveless, capsule oblongo-ovate curved cernuous, lid conical. (TAB. XXVI.)

α. majus.

Hypnum stellatum. *Schreb. Fl. Lips. p.* 92. *Hedw. Sp. Musc. p.* 280. *Turn. Musc. Hib. p.* 183. *Smith, Fl. Brit. p.* 1322. *Engl. Bot. t.* 1302. *Moug. et Nestl. n.* 234. *Schwaegr. Suppl. v.* 3. *t.* 144. *Funck, Deutschl. Moose, t.* 47. *f.* 56. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 2. *n.* 69. *Drummond, Musc. Scot. v.* 2. *n.* 76. *Arn. Disp. Musc. p.* 66.

Hypnum protensum. *Brid.—Dill. Musc. t.* 39. *f.* 35.

β. minus.

Hypnum squarrulosum. *Engl. Bot. t.* 1709.

Hypnum polymorphum. *Funck, Deutschl. Moose, t.* 47. *f.* 59.

HAB. *α.* in marshes; *β.* on stone walls and rocks.

The larger variety of this plant is of a fine yellow brown colour, and is not rare in fruit; the smaller variety, which is less upright, is of a greener tint, and has the leaves somewhat more recurved.

49. *H. Halleri;* stems creeping with short erect branches, leaves broadly ovate acuminated serrated very obscurely and shortly two-nerved their extremities remarkably recurved, capsule oblongo-ovate cernuous, lid conical. (SUPPL. TAB. V.)

Hypnum Halleri. *Linn. Diss. Meth. Musc. p.* 34. *Hedw. St. Cr. v.* 4. *t.* 21. *Schwaegr. Suppl. v.* 1. *P. II. p.* 283. *(excl. the syn. of H.*

* Mr. Arnott is disposed to consider *H. polymorphum* as a nerved variety of *H. stellatum;* in which, perhaps, after all, he is correct.

dimorphum.) Brid. Meth. p. 175. *Funck, Deutschl. Moose, t.* 49. *n.* 64. *Moug. et Nestl. n.* 626. *Grev. Scot. Cr. Fl. t.* 174. *Arn. Disp. Musc. p.* 66.

HAB. Rocks on Ben Lawers, Scotland, extremely rare.—*Messrs. Greville, Arnott, and Hooker.* It is marked in Mr. Turner's Herbarium as having been found in Herefordshire by *Mr. Dickson.*

A very beautiful and well marked moss, abundant in Switzerland, but very rare in Britain.

50. *H. dimorphum;* stems vaguely pinnated, leaves cordato-ovate concave serrulated erecto-patent obscurely two-nerved at the base those of the stems acuminated and reflexed at the extremity those of the branches acute and nearly straight, capsule ovate cernuous, lid conical. (SUPPL. TAB. V.)

Hypnum dimorphum. *Brid. Meth. p.* 165. *Funck, Deutschl. Moose, t.* 49. *n.* 65. *Moug. et Nestl. n.* 627. *Grev. Scot. Crypt. Fl. t.* 160. *(excellent, especially the magnified figures.) Arn. Disp. Musc. p.* 66.

Hypnum diversifolium. *Schleich. Cat.*

Hypnum squarrosulum. *Voit, in Sturm, Deutschl. Fl. cum ic.*

Hypnum Halleri. *var. Schwaegr. Suppl. v.* 1. *P. II. p.* 235.

HAB. Beneath rocks in very shady places upon Ben Lawers.—*Mr. Arnott.*

This really seems to be constant to its characters in various specimens that we have seen from different countries, and we are induced to follow our friend Dr. Greville in keeping it as a species distinct from the preceding.

51. *H. loreum;* leaves recurved squarrose lanceolate much acuminated concave serrated striated faintly two-nerved at the base, capsule globoso-ovate cernuous, lid conical. (TAB. XXVI.)

Hypnum loreum. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 183. *Smith, Fl. Brit. p.* 1324. *Engl. Bot. t.* 2072. *Moug. et Nestl. n.* 232. *Funck, Deutschl. Moose, t.* 50. *f.* 73. *Schwaegr. Suppl. v.* 1. *P. II. p.* 293. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 1. *n.* 91. *Drummond, Musc. Scot. v.* 2. *n.* 77. *Arn. Disp. Musc. p.* 66. *Brid. Meth. p.* 177.—*Dill. Musc. t.* 39. *f.* 40.

HAB. Woods, and on heaths, among bushes.

Main stems from a span to nearly a foot in length, scarcely thickened at the extremity, lower branches often rooting and attenuated. Leaves frequently subsecund.

52. *H. triquetrum;* leaves squarrose cordate gradually acuminated plane serrated faintly striated, with two nerves at the base, capsule globoso-ovate, lid conical. (TAB. XXVI.)

Hypnum triquetrum. *Linn. Sp. Pl. p.* 1589. *Turn. Musc. Hib. p.* 186. *Smith, Fl. Brit. p.* 1325. *Engl. Bot. t.* 1622. *Moug. et Nestl. n.* 235. *Funck, Deutschl. Moose, t.* 48. *f.* 62. *Schwaegr. Suppl. v.* 1. *P. II. p.* 80. *Brid. Meth. p.* 175. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 1. *n.* 90. *Drummond, Musc. Scot. v.* 1 *n.* 93. *Arn. Disp. Musc. p.* 67.—*Dill. Musc. t.* 38. *f.* 28.

HAB. Woods, abundant.

Plant robust, from six to eight or ten inches long; stems pinnate, much thickened at the extremity, the branches attenuated and often rooting, a circumstance which does not occur in the following *H. brevirostre.*

53. *H. brevirostre;* leaves squarrose broadly ovate concave without striæ acuminated suddenly and with an evident contraction so as to terminate in a long narrow point serrated faintly two-nerved at the base, capsule ovate, lid short conical. (SUPPL. TAB. V.)

Hypnum brevirostre. *Ehrh. (not Engl. Bot.) Schwaegr. Suppl. v.* 1. *P. II. p.* 279. *Brid. Meth. p.* 175. *Hook. Fl. Scot. P. II. p.* 146. *Funck, Deutschl. Moose, t.* 48. *n.* 61. *Moug. et Nestl. n.* 423. *Hobson, Brit. Mosses, v.* 2. *n.* 70. *Arn. Disp. Musc. p.* 67.

Hypnum triquetrum. *β. minus. Hooker and Tayl. Musc. Brit. p.* 108.

Hypnum erectum. *Raddi.*

HAB. Woods, perhaps, not very rare. Near New Forest.—*Mr. Lyell.* Manchester.—*Mr. Hobson.* Devonshire.—*Rev. W. T. Bree.* Woods in Argyleshire.—*Captain Carmichael.*

This is abundantly distinct from *H. triquetrum*, with which we were disposed to unite it in the first edition of this work, and certainly a very handsome plant.

54. *H. squarrosum;* leaves squarrose widely cordate very much acuminated and recurved serrated faintly two-nerved at the base, capsule ovato-globose cernuous, lid conical. (TAB. XXVI.)

Hypnum squarrosum. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 184. *Smith, Fl. Brit. p.* 1323. *Engl. Bot. t.* 1593. *Moug. et Nestl. n.* 233. *Funck, Deutschl. Moose, t.* 48. *f.* 63. *Schwaegr. Suppl.*

v. 1. *P. II. p.* 82. *Brid. Meth. p.* 170. *Hook. Fl. Scot. P. II. p.* 146. *Hobson, Brit. Mosses, v.* 1. *n.* 92. *Drummond, Musc. Scot. v.* 2. *n.* 78. *Arn. Disp. Musc. p.* 67.—*Dill. Musc. t.* 39. *f.* 38 *and* 39.

HAB. Woods and on heaths, common.

Stems slender, from four to six inches long, variously branched, with the leaves sometimes recurved at the extremity, so as to form a disk in the centre.

2. *Leaves secund.*

A. *Leaves with a single nerve.*

55. *H. filicinum;* branches pinnate, leaves especially the upper ones falcato-secund broadly ovate acuminated serrated their nerve reaching to the point, capsule oblongo-ovate curved, cernuous, lid conical. (TAB. XXVI.)

Hypnum filicinum. *Linn. Sp. Pl. p.* 1590. *Hedw. Sp. Musc. t.* 76. *f.* 5—10. *Turn. Musc. Hib. p.* 197. *Smith, Fl. Brit. p.* 1334. *Engl. Bot. t.* 1570. *Moug. et Nestl. n.* 228. *Hook. Fl. Scot. P. II. p.* 147. *Hobson, Musc. Brit. v.* 2. *n.* 71. *Drummond, Musc. Scot. v.* 2. *n.* 79. *Schwaegr. Suppl. v.* 1. *P. II. p.* 297. *Brid. Meth. p.* 177. *Arn. Disp. Musc. p.* 67.

Hypnum dubium. *Swartz.—Engl. Bot. t.* 2126. *Turn. Musc. Hib. p.* 195.

Hypnum fallax. *Brid. Musc. v.* 3. *t.* 3. *f.* 1. *Engl. Bot. t.* 2127.

Hypnum fluviatile. *Swartz.—Hedw. Sp. Musc. p.* 277. *t.* 72. *f.* 4.? *Brid. Meth. p.* 182. *together with* lanatum, gracilescens, diffusum, Seligeri, *of the same author.*

Hypnum Vallæ Clusii. *Brid.—Dill. Musc. t.* 36. *f.* 19.

HAB. Bogs and sides of rivulets.

This plant is subject to vary greatly in its general appearance, in size, and somewhat in the shape and direction of the leaves. Its branches are erect, pinnate, frequently clothed with downy ferruginous roots; and the stems themselves, and nerves of the leaves are reddish brown. The cauline leaves are the shortest and broadest, with the nerve excurrent, which is characteristic of the species, and, together with the less falcate foliage, distinguishes it from *H. commutatum*, notwithstanding that Schwaegrichen has lately united them. The large variety, growing in running water, is the *H. fallax* of *Engl. Bot.*, and probably also of Bridel. But this again Schwaegrichen has

joined to *H. fluviatile*, a plant we believe unknown to Britain, and appearing, as far as we can judge from the figure in the *Species Muscorum*, very unlike *H. fallax*. *H. falcatum* of *Schwaegr. Suppl. v.* 3. *t.* 145. likewise seems little different from our plant, which, when growing in waters impregnated with calcareous matter, is seen to have the stems bristly at the base, from the strong nerves that remain after the decay of the rest of the leaf.

56. *H. atro-virens*; stems variously branched procumbent, leaves all of them slightly secund broadly ovate with an attenuated obtuse point, the nerve running nearly to the summit, capsule ovate cernuous, lid conical. (Tab. XXVI.)

Hypnum atro-virens. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 10. *Turn. Musc. Hib. p.* 169. *Smith, Fl. Brit. p.* 1307. *Engl. Bot. t.* 2422. *Hook. Fl. Scot. P. II. p.* 147. *Arn. Disp. Musc. p.* 67.

Hypnum filamentosum. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 11. *Smith, Fl. Brit. p.* 1308. *Brid. Meth. p.* 167.

Hypnum attenuatum. *Dicks.—Engl. Bot. t.* 2420. (not *Leskea attenuata*, Hedw.)

Leskea incurvata. *Hedw. Sp. Musc. t.* 53. (not *H. incurvatum*, Mohr and Schwaegr.) *Funck, Deutschl. Moose, t.* 36. *f.* 7. *Moug. et Nestl. n.* 421.

Hab. Trees and rocks in mountainous countries.

Sir J. E. Smith, on the authority of Dillenius, has attributed to *H. atro-virens* a subulate lid; but the plant referred to in the *Hist. Musc. t.* 43. *f.* 67. is a very distinct species, from Virginia, (not Patagonia, as mentioned by mistake in *Engl. Bot.*) *H. filamentosum* of Dickson differs in no particular from our plant, nor does the *H. attenuatum* of the same author, as we have ascertained by an examination of his own specimens in Mr. Turner's Herbarium. Equally authentic specimens, viz. from the younger Hedwig, prove our plant to be the same as his *Leskea incurvata*, but we have preferred the older name given by our countryman. We have been greatly inclined to add to our synonyms *H. fluviatile*, which accords so well in its foliage; but that has more distantly placed leaves, and a longer capsule. Our plant, likewise, bears no inconsiderable resemblance in many points to *H. filicinum*; it differs, however, in being procumbent, in its loose and straggling ramification, more

closely set, shorter, broader, more concave and more obtuse leaves, with the margin more reflexed, quite entire, the nerve broader, of the same colour as the leaf, disappearing below the point; besides all which, the texture of the leaves is thicker and softer, with distinct cellules; whereas in *H. filicinum* they are somewhat scariose.

57. *H. palustre;* leaves secundo-ovate somewhat acuminate concave entire margins incurved above the nerve short often forked sometimes obsolete, capsule oblongo-ovate cernuous, lid conical. (Tab. XXVI.)

Hypnum palustre. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 191. *Smith, Fl. Brit. p.* 1329. *Engl. Bot. t.* 1655. *Schwaegr. Suppl. v.* 1. *P. II. p.* 292. *Brid. Meth. p.* 181. *Hook. Fl. Scot. P. II. p.* 147. *Hobson, Brit. Mosses, v.* 1. *n.* 88. *Drummond, Musc. Scot. v.* 2. *n.* 80. *Funck, Deutschl. Moose, t.* 50. *f.* 70. *Arn. Disp. Musc. p.* 67.

Hypnum luridum. *Hedw. St. Cr. v.* 4. *t.* 38.

Hypnum fluviatile. *Turn. Musc. Hib. p.* 192. *Engl. Bot. t.* 1303. *(not Hedw.)*

Hypnum palustre. *Moug. et Nestl. n.* 521. *and H. salebrósum? n.* 428.

Hypnum subsphærocarpum. *Funck, Deutschl. Moose, t.* 53. *f.* 84.

Hypnum adnatum. *Turn. Musc. Hib. p.* 165. *Engl. Bot. t.* 2406. *(not Hedw.)—Dill. Musc. t.* 37. *f.* 27.

Hab. Banks of rivers and standing waters, and on wet rocks, abundant.

Variable as is this species, we trust that it will be found constant to the above characters. The plant, or at least its main stems, is usually upright, thickly crowded, the leaves flaccid, varying from a deep lurid green, the most common tint, to a bright and pale yellow in some situations. The nerve is sometimes obsolete, rarely half the length of the leaf, more frequently forked or double. Dr. Stokes' specimens of *H. fluviatile*, figured in *Engl. Bot.* are *H. palustre;* and we do not know that the true *fluviatile* has ever been found in Britain. Such is the case also with the *H. adnatum* of *Engl. Bot.* The true *H. adnatum* has a differently shaped leaf, and is, we believe, altogether an American plant.

58. *H. fluitans;* leaves loosely imbricated the upper ones especially falcato-secund all of them lanceolato-subulate scarcely ser-

rated at their points, capsule ovato-oblong curved cernuous, lid conical. (Tab. XXIV.)

Hypnum fluitans. *Linn. Fl. Suec. ed.* 2. *p.* 399. *Hedw. St. Cr. v.* 4. *t.* 36. *Turn. Musc. Hib. p.* 182. *Smith, Fl. Brit. p.* 1319. *Engl. Bot. t.* 1448. *Moug. et Nestl. n.* 526. *Funck, Deutschl. Moose, t.* 53. *f.* 83. *Schwaegr. Suppl. v.* 1. *P. II. p.* 304. *Brid. Meth. p.* 180. *Hook. Fl. Scot. P. II. p.* 147. *Hobson, Brit. Mosses, v.* 2. *n.* 60. *Drummond, Musc. Scot. v.* 2. *n.* 83. *Arn. Disp. Musc. p.* 68.—*Dill. Musc. t.* 38. *f.* 33.

Hypnum scoparium. *Brid. Meth. p.* 180.

Hab. In pools and streams of water; rarely fructifying but in places that are only occasionally inundated.

Stems often a span long. Colour varying from pale green to a deep purple in alpine rivulets. It has seemed so doubtful where this species should be arranged, that, following the opinion of Mohr, we have placed it under the section of "Leaves falcato-secund," instead of leaving it in the division where we had arranged it in our first edition.

59. *H. aduncum;* leaves falcato-secund lanceolate-subulate concave or almost semicylindrical entire the nerve disappearing below the summit, capsule oblongo-ovate curved cernuous, lid conical. (Tab. XXVI.)

α. revolvens; leaves narrow, very much falcate.

Hypnum aduncum. *Linn. Sp. Pl. p.* 1592. *Hedw. St. Cr. v.* 4. *t.* 24. *Turn. Musc. Hib. p.* 189. *Smith, Fl. Brit. p.* 1327. *Funck, Deutschl. Moose, t.* 52. *f.* 81. *Hook. Fl. Scot. P. II. p.* 147. *Schwaegr. Suppl. v.* 1. *P. II. p.* 299. *Brid. Meth. p.* 180. *Hobson, Brit. Mosses, v.* 1. *n.* 93. *Drummond, Musc. Scot. v.* 2. *n.* 81. *Arn. Disp. Musc. p.* 68.

Hypnum revolvens. *Swartz, Musc. Suec.*—*Turn. Musc. Hib. p.* 188. *Engl. Bot. t.* 2073. *Funck, Deutschl. Moose, t.* 52. *f.* 80. *tenue. Moug. et Nestl. n.* 524.—*Dill. Musc. t.* 37. *f.* 26.

β. rugosum; leaves wider, less falcate, somewhat rugose.

Hypnum rugosum. *Linn. Mant. p.* 131. *(according to Smith.) Engl. Bot. t.* 2250. *(not Hedw. nor Schwaegr.) Moug. et Nestl. n.* 230.?

Hypnum lycopodioides. *Schwaegr. Suppl. v.* 2. *p.* 300. *Funck, Deutschl. Moose, t.* 51. *f.* 75.—*Dill. Musc. t.* 37. *f.* 24.

Hab. Bogs, common.

We have but little hesitation in uniting the three species, (as they have hitherto been considered,) *aduncum*, *revolvens*, and *rugosum;* and Schwaegrichen, who has kept them separate in

his valuable Supplement to Hedwig's *Species Muscorum*, yet says of them "inter se pari affinitate conjunguntur et ulteriorem disquisitionem in loco natali, in quo copiose inveniuntur, exigunt." *H. revolvens* scarcely differs from the common appearance of *aduncum*, but in its deeper, almost purple-black colour, and generally more falcate leaves; whilst these are in the var. *rugosum* much broader, somewhat wrinkled, especially when dry, and the nerve we have remarked to be usually longer. In size and general habit this variety approaches *H. scorpioides*, but that has no nerve.

60. *H. uncinatum*; leaves falcato-secund lanceolato-subulate serrated striated the nerve disappearing below the point, capsule cylindrical curved cernuous, lid conical. (TAB. XXVI.)

Hypnum uncinatum. *Hedw. St. Cr. v. 4. t. 5. Turn. Musc. Hib. p.* 190. *Smith, Fl. Brit. p.* 1328. *Engl. Bot. t.* 1600. *Moug. et Nestl. n.* 335. *Funck, Deutschl. Moose, t.* 53. *f.* 82. *Schwaegr. Suppl. v.* 1. *P. II. p.* 304. *Brid. Meth. p.* 180. *Hobson, Brit. Mosses, v.* 1. *n.* 89. *Drummond, Musc. Scot. v.* 2. *n.* 82. *Arn. Disp. Musc. p.* 68. *Hook. Fl. Scot. P. II. p.* 147.

HAB. Moist banks and walls, principally in subalpine countries.

The slender stems, which are pinnated, the long and uncinate leaves, and brighter colour, together with their striation and serratures, abundantly distinguish this from *H. aduncum* and all its affinities.

61. *H. rugulosum*; leaves secund ovato-lanceolate serrated nearly plane crisped transversely when dry margins recurved the nerve reaching half way. (TAB. XXVI.)

Hypnum rugulosum. *Web. et Mohr, Fl. Cr. Germ. p.* 366. *Moug. et Nestl. n.* 231. *Arn. Disp. Musc. p.* 68.

Hypnum rugosum. *Hedw. Sp. Musc. p.* 293. *St. Cr. v.* 4. *t.* 23. *f.* A. *(leaf only.)* *Schwaegr. Suppl. v.* 1. *P. II. p.* 301. *Brid. Meth. p.* 68.

HAB. On the ground in heathy places in Norfolk.—*Mr. Eagle.* On Ben Lawers, and on Ben Voirlich, by Loch Lomond side; also on rocks in Breadalbane, and near Kenmore.—*Mr. Arnott.*

Plant from two to four inches, creeping in dense tufts upon the ground, of a yellow green colour, often bordering on brown.

The transverse undulations are peculiarly striking even to the naked eye, in which particular, as well as in the broader and shorter, more plane, secund, but not falcate leaves, it differs from all the varieties of *H. aduncum*. Its fructification, we believe, has never been found in any country.

62. *H. commutatum;* stems pinnated, leaves falcato-secund cordate very much acuminated serrated their margins reflexed nerve disappearing below the summit, capsule oblong curved and cernuous, lid conical. (Tab. XXVII.)

Hypnum commutatum. *Hedw. St. Cr. v. 4. t. 26. Turn. Musc. Hib. p. 196. Smith, Fl. Brit. p. 1333. Engl. Bot. t. 1569. Moug. et Nestl. n. 523. Funck, Deutschl. Moose, t. 5. f. 79. Brid. Meth. p. 177. Hook. Fl. Scot. P. II. p. 148. Hobson, Brit. Mosses, v. 1. n. 94. Drummond, Musc. Scot. v. 2. n. 84. Arn. Disp. Musc. p. 67. —Dill. Musc. t. 36. f. 19.*

Hypnum filicinum. *var. Schwaegr. Suppl. v. 1. P. II. p. 297.*

Hab. Wet places, particularly in a calcareous soil.

Besides the characters that we have pointed out under *H. filicinum* to distinguish that and the present species, we may add, that this is much the largest, far less rigid in the stems and leaves, and of a paler and greener colour. The leaves are likewise, (for want of the excurrent nerve,) disposed to be curved, and to become twisted when dry.

B. *Leaves destitute of a nerve, or furnished with two very indistinct ones at the base.*

63. *H. scorpioides;* leaves secund broadly ovate ventricose obtuse entire nerveless, capsules oblongo-ovate curved cernuous, lid conical. (Tab. XXVII.)

Hypnum scorpioides. *Linn. Sp. Pl. p. 1592. Hedw. Sp. Musc. p. 295. Schwaegr. Suppl. v. 1. P. II. p. 293. t. 95. Turn. Musc. Hib. p. 187. Smith, Fl. Brit. p. 1326. Engl. Bot. t. 1039. Moug. et Nestl. n. 522. Funck, Deutschl. Moose, t. 51. f. 74. Hook. Fl. Scot. P. II. p. 148. Hobson, Brit. Mosses, v. 2. n. 72. Drummond, Musc. Scot. v. 2. n. 85. Arn. Disp. Musc. p. 68. Brid. Meth. p. 181.*

Hab. Bogs, common;—on the Sands of Barrie near Forfar.—*Mr. Drummond.*

This, which is one of the largest of the British Mosses, is at once distinguished from its affinities by its obtuse and nerveless

leaves. Schwaegrichen has represented his magnified leaves as two-nerved at the base, which we never could find to be the case in our specimens. It appears to be a species but little understood on the Continent.

64. *H. silesianum;* leaves loosely imbricated secund narrow lanceolate acuminated serrated nerveless or very obscurely two-nerved, capsule subcylindrical erecto-cernuous, lid conical obtuse. (Tab. XXVII.)

Hypnum silesianum. *Pal. de Beauv. Prodr. p.* 70. *Web. et Mohr, Fl. Cr. Germ. p.* 343. *Smith, Engl. Bot. t.* 2016. *Schwaegr. Suppl. v.* 1. *P. II. p.* 287. *t.* 94. *Moug. et Nestl. n.* 425. *Funck, Deutschl. Moose, t.* 49. *f.* 68. *Hook. Fl. Scot. P. II. p.* 148. *Arn. Disp. Musc. p.* 68. *Brid. Meth. p.* 169.

Hab. Summit of Ben Luyal, in Sutherland. Alps of Scotland, not uncommon.

This plant is scarcely to be known from some of the small varieties of *H. cupressiforme* but by its less falcate, more serrated, narrower leaves, and shorter lid. Indeed, the serratures reach down nearly the whole length of the margins, but then we have observed them to be more or less apparent in different specimens. Schwaegrichen says that the fruitstalks arise from near the base of the stem, a circumstance which, though general, is not constant. In the alpine parts of Switzerland it is extremely common, retaining all the characters we have given it.

65. *H. cupressiforme;* leaves closely imbricated more or less falcato-secund lanceolate acuminated entire except at the points which are usually serrated very faintly two-nerved at the base, capsule cylindrical erecto-cernuous, lid conical with a point. (Tab. XXVII.)

α. vulgare; stems broad, semicylindrical; leaves falcato-secund.

Hypnum cupressiforme. *Linn. Sp. Pl. p.* 1592. *Hedw. St. Cr. v.* 4. *t.* 23. *Turn. Musc. Hib. p.* 193. *Smith, Fl. Brit. p.* 1331. *Engl. Bot. t.* 1860. *Moug. et Nestl. n.* 229. *Funck, Deutschl. Moose, t.* 49. *f.* 69. *Schwaegr. Suppl. v.* 1. *P. II. p.* 290. *Brid. Meth. p.* 178. *Hook. Fl. Scot. P. II. p.* 148. *Hobson, Brit. Mosses, v.* 1. *n.* 95. *Drummond, Musc. Scot. v.* 2. *n.* 86. *Arn. Disp. Musc. p.* 68.

Hypnum nigro-viride. *Dicks.—Turn. Smith.—Dill. Musc. t.* 37. *f.* 23. *and t.* 41. *f.* 53.

β. compressum; stems slender, compressed; leaves falcato-secund.

Hypnum compressum. *Linn. Mant. v.* 2. *p.* 310.—*Dill. Musc. t.* 36. *f.* 22.

γ. tenue; stems very slender; leaves very slightly curved, narrow, lanceolate, quite entire.

Hypnum polyanthos. *Engl. Bot. t.* 1664. *(not Leskea polyanthos, Hedw.) Turn. Musc. Hib. p.* 137.

HAB. On banks and trunks of trees, extremely common; *β.* particularly abundant in shady woods; *γ.* mostly on trees.

So sportive is the present plant that it is scarcely possible to define in a few words the marks belonging to any of the varieties. The most striking, however, is our *γ.* the *H. polyanthos* of British authors, but not the *Leskea polyanthos* of Hedwig, which is a true *Leskea.* At first sight its appearance is totally unlike the more usual state of *H. cupressiforme;* and we should, perhaps, have hesitated about uniting them, had we not seen the one, in some cases, running completely into the other. The *H. incurvatum* of Schrader and Schwaegrichen likewise borders upon this state of *H. cupressiforme,* but it differs in the shorter and more cernuous capsule. The *var. compressum* is now universally acknowledged to belong to our plant; and we are equally satisfied of Mr. Dickson's *nigro-viride* being no other.

66. *H. Crista-castrensis;* stems closely pectinated, leaves falcato-secund ovato-lanceolate acuminated serrulate striated faintly two-nerved at the base, capsule oblongo-ovate curved cernuous, lid conical. (TAB. XXVII.)

Hypnum Crista-castrensis. *Linn. Sp. Pl. p.* 1591. *Hedw. Sp. Musc. t.* 76. *f.* 1—4. *Engl. Bot. t.* 2108. *Moug. et Nestl. n.* 140. *Funck, Deutschl. Moose, t.* 72. *f.* 72. *Hook. Fl. Scot. P. II. p.* 148. *Hobson, Brit. Mosses, v.* 2. *n.* 73. *Drummond, Musc. Scot. v.* 1. *n.* 95. *Schwaegr. Suppl. v.* 1. *P. II. p.* 293. *Brid. Meth. p.* 177. *Arn. Disp. Musc. p.* 69.

HAB. Woods in Yorkshire.—*Mr. Backhouse.* Kenmore Hill; above the Sheep Park at Taymouth; and in vast abundance near the summit of Schechallion.—*Mr. M'Intosh.* Ben Voirlich; Hill of Kinnoul near Perth; and on Ben Lawers.—*Mr. Arnott.* In a wood at the head of Hawes-water.—*Rev. James Dalton.* Clova mountains, Scotland, plentiful.—*Mr. Drummond.*

This most elegant species, so rare in general in this country, is one of the most abundant of mosses in the Fir Forests of

Switzerland, where it grows along with the *Linnæa borealis*, bearing fruit in autumn. It is readily distinguished from *H. molluscum*, not only by its much larger size, and more regularly pectinated stems, but by the strongly striated leaves.

67. *H. molluscum;* stems pectinated, leaves falcato-secund cordate much acuminated serrated not striated faintly two-nerved at the base, capsule oblongo-ovate curved cernuous, lid conical. (TAB. XXVII.)

Hypnum molluscum. *Hedw. St. Cr. v.* 4. *t.* 22. *Turn. Musc. Hib. p.* 198. *Smith, Fl. Brit. p.* 1335. *Engl. Bot. t.* 1327. *Moug. et Nestl. n.* 141. *Funck, Deutschl. Moose, t.* 50. *f.* 71. *Hook. Fl. Scot. P. II. p.* 148. *Hobson, Brit. Mosses, v.* 1. *n.* 96. *Drummond, Musc. Scot. v.* 1. *n.* 96. *Schwaegr. Suppl. v.* 1. *P. II. p.* 293. *Brid. Meth. p.* 177. *Arn. Disp. Musc. p.* 69.

Hypnum Crista-castrensis. *Dicks.—Dill. Musc. t.* 36. *f.* 20.

HAB. On the ground, common.

This has been taken even by some of our British Botanists for the preceding, but not by Dillenius, as Sir James Smith supposed. His figures, both A. and B. belong truly to our present plant.

XXXIV. TIMMIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth, the *interior* a plicated membrane, cut into 32 equal *ciliæ*, variously united at the base by transverse bars and frequently cohering at the points. *Calyptra* dimidiate. (SUPPL. TAB. VI.)

1. *T. megapolitana.* (SUPPL. TAB. VI.)

α. Capsule inclined.

Timmia megapolitana. *Hedw. Sp. Cr. v.* 1. *t.* 31. *Schwaegr. Suppl. v.* 1. *P. II. p.* 84. *Funck, Deutschl. Moose, t.* 28. *n.* 1. *Schwaegr. in Franklin's Journ. App. p.* 756.

Timmia polytrichioides. *Brid. Meth. p.* 122. *Arn. Disp. Musc. p.* 48.

Timmia cucullata. *Michaux. Fl. Bor. Am. v.* 2. *p.* 304. *(with the calyptra persistent upon the fruitstalk.)*

β. Capsule cernuous.

Timmia austriaca. *Hedw. Sp. Musc. p.* 176. *t.* 42. *f.* 1—7. *Schwaegr. Suppl. v.* 1. *P. II. p.* 84. *Funck, Deutschl. Moose, t.* 28. *n.* 2.

HAB. Exceedingly rare on rocks on the banks of the Isla, above Airly Castle, Forfarshire. Discovered by *Mr. Drummond* in 1824; but always barren.

Plant growing in dense tufts three to four inches high, erect, slightly branched, brown below, from the decayed foliage and roots, green above. *Leaves* linear-lanceolate, erecto-patent, plane or slightly recurved at the margin, serrated, a little carinated, with a strong nerve reaching to the point, crisped when dry. *Fruitstalk* one to two inches long, reddish. *Capsule* oblongo-obovate, inclined in α, cernuous or horizontal in β. *Lid* hemisphærical, slightly mammillate.

It is to be hoped that the fructification of this valuable addition to the British Muscologia, will one day be detected by its acute discoverer. The stems and foliage of the Scottish specimens are remarkably fine, as much so as those growing upon the alps of Savoy bordering upon Italy, where the plant is far from uncommon, and where it bears fruit abundantly. The only difference between the two Hedwigian species that we can find is the direction of the capsule; the leaves being the same in both. The American state of it is remarkable in having the capsule pass through the fissure of the calyptra, which then remains attached to the upper part of the fruitstalk, surrounding it with its convolute base, and resembling, as my friend Mr. Parker has justly observed, the spatha in the genus *Narcissus*. This is found from Pennsylvania to the country between Point Lake and the Arctic Sea.

XXXV. BRYUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth; the *interior* of a membrane cut into 16 equal segments, with filiform processes frequently placed between them; *Calyptra* dimidiate. (TAB. III.)

For the same reasons as we have united *Leskea* with *Hypnum* have we incorporated *Pohlia* of Hedwig with *Bryum*. *Meesia*,

likewise, we have called by the old name of *Bryum*; because although the shortness of the teeth in two of the species be very striking, yet in *M. dealbata* they are nearly equal in length to the inner peristome. The genus *Mnium*, we think, cannot be separated from *Bryum* whilst *Hypnum undulatum* remains with that genus; whilst *Bartramia arcuata*, which has a smooth capsule, is retained with the other *Bartramiæ* having sulcated capsules; and whilst similarly anomalous species are suffered to continue in several other genera.

I. *Capsules sulcated.*

1. *B. androgynum*; stems nearly simple, leaves lanceolate serrated their margins recurved, capsules nearly erect cylindrical sulcated, lid conical. (Tab. XXVIII.)

   Bryum androgynum. *Hedw. Sp. Muse. p.* 178. *Turn. Musc. Hib. p.* 113. *Hook. Fl. Scot. P. II. p.* 149. *Moug. et Nestl. n.* 620. *Brid. Meth. Musc. p.* 117. *Arn. Disp. Musc. p.* 43.

   Mnium androgynum. *Linn. Sp. Pl. p.* 1574. *Engl. Bot. t.* 1328. *Smith, Fl. Brit. p.* 1344.

   Gymnocephalus androgynus. *Schwaegr. Suppl. v.* 2. *p.* 87. *Funck, Deutschl. Moose, t.* 28. *f.* 1.—*Dill. Musc. t.* 31. *f.* 1.

   Hab. In woods and on banks.

   Stems from one to two inches in length, slightly branched, erect. Leaves erect, appressed or subpatent, lanceolate, acute, serrated, especially towards the extremity, the margins recurved; the nerve reaching nearly to the point; surface papillose; colour pale yellow-green, especially when dry. Male flowers, as Hedwig considers them, capitular, terminating an elongated portion of the stem, upon which the leaves gradually become smaller and disappear upwards. Capsule cylindrical, scarcely inclined, sulcated, brown, lid conical.

   Upon examining some continental specimens of this plant, we find that the inner peristome has a pair of cilia between each of the segments, and that these segments are cleft from the base almost to the extremity.

2. *B. palustre*; stems much branched, leaves lanceolate obtuse entire their margins revolute, capsules ovate oblique sulcated, lid conical. (Tab. XXVIII.)

Bryum palustre. *Swartz.—Engl. Bot. t.* 391. *Turn. Musc. Hib. p.* 113. *Moug. et Nestl. n.* 135. *Hook. Fl. Scot. P. II. p.* 149. *Hobson, Brit. Mosses, v.* 1. *n.* 97. *Drummond, Musc. Scot. v.* 1. *n.* 97. *Arn. Disp. Musc. p.* 133.

Mnium palustre. *Linn. Sp. Pl. p.* 1574. *Hedw. Sp. Musc. p.* 188. *Schwaegr. Suppl. v.* 1. *P. II. p.* 122. *Brid. Meth. p.* 121. *Smith, Fl. Brit. p.* 1346.

Mnium polycephalum *and* inordinatum. *Brid. Meth. and* M. reclinatum. *Schwaegr. Suppl. v.* 1. *P. II. p.* 108.—*Dill. Musc. t.* 31. *f.* 3.

HAB. Bogs.

Stems from two to four inches long, much branched, and frequently throwing out innovations. Leaves erecto-patent, lanceolate, obtuse, the margins much recurved or revolute, entire, or at most appearing but very indistinctly serrulate at the point, under a high magnifying power; the nerve reaching almost to the point; the surface papillose. Male flowers, according to Hedwig, and other authors, discoid. Those terminal capitular bodies, which so much resemble the anthers of *B. androgynum*, are considered gemmæ, and arise not only from the main stems but from the innovations, which become gradually lengthened out, and are destitute of leaves. Capsules ovate, oblique, sulcated, brown; lid conical.

Notwithstanding the close affinity between the present and the preceding species, they have, by many authors, been placed in different genera. In both, the leaves are of the same form and texture, but the present species has them somewhat obtuse, and, for the most part, entire; when otherwise, (for they are subject to vary,) the similarity is very great. In the capsule there is a further difference, and according to Hedwig, a more important one in the capitula terminating the stems or branches; for while in one species, (*B. androgynum,*) they are considered to perform the office of anthers, in the other they can be only looked upon as gemmæ, the male flowers being discoid.—The structure of the inner peristome of this exactly resembles that of the preceding species.

We wonder at Mohr's describing the leaf of *B. palustre* as subulate. Some of them, indeed, have the margins so revolute as to appear at first sight almost linear.

II. *Capsules smooth, (destitute of furrows.)*

1. *Teeth of the external peristome shorter than the interior ones.*

3. *B. trichodes;* stems somewhat branched, leaves linear obtuse entire reticulated, capsule obovate recurved subcernuous, fruitstalks very long. (Tab. XXVIII.)

Bryum trichodes. *Linn. Sp. Pl. p.* 1585. *Dicks.—Smith, Fl. Brit. p.* 1350. *Engl. Bot. t.* 1517. *Hook. Fl. Scot. P. II. p.* 149. *Hobson, Brit. Mosses, v.* 2. *n.* 74. *Drummond, Musc. Scot. v.* 1. *n.* 98. *Arn. Disp. Musc. p.* 43.

Meesia uliginosa. *Hedw. St. Cr. v.* 1. *t.* 1, 2. *Moug. et Nestl. n.* 727. *Brid. Meth. p.* 122. *Funck, Deutschl. Moose, t.* 28. *f.* 1.

Meesia minor. *Brid.—Funck, Deutschl. Moose, t.* 28. *f.* 2.—*Dill. Musc. t.* 49. *f.* 58.

Hab. Highland mountains, in wet places.

Stems an inch or more in length. Leaves erecto-patent, canaliculate; nerve strong, disappearing below the point; colour a deep yellow-green, shining. This and the two following species constitute the Hedwigian genus *Meesia*, characterised by the short obtuse teeth of the peristome.

4. *B. triquetrum;* stems elongated branched, leaves lanceolate carinate acute serrated reticulated, capsule pyriform erecto-cernuous, fruitstalks very long. (Tab. XXVIII.)

Bryum triquetrum. *Turn. Musc. Hib. p.* 115. *Engl. Bot. t.* 2394. *Hook. Fl. Scot. P. II. p.* 149. *Arn. Disp. Musc. p.* 43.

Mnium triquetrum. *Linn. Sp. Pl. p.* 1578.

Meesia longiseta. *Hedw. St. Cr. v.* 1. *t.* 22.

Diplocomium longisetum. *Web. et Mohr. Fl. Cr. Germ. p.* 874. *Moug. et Nestl. n.* 327.

Diplocomium hexastichon, *and* D. tristichum. *Funck, Deutschl. Moose, t.* 27. *f.* 1 *and* 2.

Hab. On the borders of some lake in the north of Ireland.—*Dr. Scott.*

The only station for this fine plant in the British dominions is that very vague one given above. We have seen the solitary specimen that has been communicated by Dr. Scott to Mr. Turner. It is intermixed with *B. dealbatum*. The present moss is remarkable for the great length of its fruitstalks, and for its broad, serrated, and carinated leaves, which are often

trifariously inserted. Mohr has separated this from the other two species of *Meesia*, in consequence of the segments of the inner peristome, being connected by a reticulated membrane, ("opere reticuloso connexa.") We have, ourselves, seen portions of a cellular or reticulated substance attached to these teeth, which probably in an earlier stage connected them for their whole length. The exterior teeth are short and obtuse, as in the preceding species.

5. *B. dealbatum;* stems short, leaves lanceolate acute plane reticulated serrated at the points, capsule pyriform nearly erect. (TAB. XXVIII.)

Bryum dealbatum. *Dicks. Pl. Crypt. Fasc.* 2. *t.* 5. *f.* 3. *Smith, Fl. Brit. p.* 1350. *Engl. Bot. t.* 1571. *Turn. Musc. Hib. p.* 115. *Hook. Fl. Scot. P. II. p.* 149. *Drummond, Musc. Scot. v.* 2. *n.* 88. *Arn. Disp. Musc. p.* 43.

Meesia dealbata. *Swartz, Musc. Suec. t.* 5. *f.* 10. *Hedw. Sp. Musc. t.* 41. *f.* 6—9.

HAB. Boggy mountains in Scotland and Ireland.

This is less rare than *B. trichodes*, to which it has much affinity; but the foliage, when examined, will be found of a different form and texture, and the fruitstalks are shorter in proportion to the length of the stems. Athough this has all the habit of a *Meesia*, it departs from the characteristic mark of that genus, in having the external teeth nearly as long as the internal peristome, and they can scarcely be termed obtuse.

2. *Teeth of the exterior peristome as long as the interior one.*

* *Leaves subulate.*

6. *B. pyriforme;* stems slightly branched, leaves subulato-setaceous flexuose serrated nerve very broad, capsule pyriform pendulous. (TAB. XXVIII.)

Bryum pyriforme. *Swartz, Musc. Suec.—Mong. et Nestl. n.* 31. *Hook. Fl. Scot. P. II. p.* 149. *Hobson, Brit. Mosses, v.* 2. *n.* 75. *Arn. Disp. Musc. p.* 45.

Bryum aureum. *Turn. Musc. Hib. p.* 118. *Smith, Fl. Brit. p.* 1348. *Engl. Bot. t.* 389.

Webera pyriformis. *Hedw. St. Cr. v.* 1. *t.* 3. *Funck, Deutschl. Moose, t.* 25. *f.* 1.

Mnium pyriforme. *Linn.—Dill. Musc. t.* 50. *f.* 60.

HAB. Rocks, especially of sandstone; likewise on the mould of garden pots.

Bryum pyriforme is remarkable in the shape of its leaves, of which the upper ones are much the longest and most flexuose. They are composed, moreover, except at the very base, almost wholly of nerve; there being only a narrow membranous margin, which, towards the extremity, is deeply serrated. The capsule and fruitstalk are of a bright orange colour when mature.

* * *Leaves never subulate.*

† *Leaves without any thickened margin.*

+ *Leaves very obtuse.*

7. *B. julaceum*; stems branched, leaves closely imbricated broadly ovate concave entire obtuse nerve running nearly to the point, capsule obovato-cylindraceous pendulous. (TAB. XXVIII.)

Bryum julaceum. *Schrad. Spicil. p.* 70. *Smith, Fl. Brit. p.* 1357. *Engl. Bot. t.* 2270. *Hook. Fl. Scot. P. II. p.* 149. *Arn. Disp. Musc. p.* 45.

Bryum argenteum. *β. Linn. Sp. Pl.—Schwaegr. Suppl. v.* 1. *P. II. p.* 188.

Hypnum argenteum. *β. Mohr.—Dill. Musc. t.* 50. *f.* 63.

HAB. Mountains in England, Scotland, and Ireland.

The characters above given we have found constant in this plant, and we therefore cannot agree with Mohr and Schwaegrichen, who, following Linnæus, have considered it as merely a variety of *B. argenteum*. It is not in the shape of the leaf and of the capsules only that they differ, but our individuals are taller and more slender, of a yellowish green colour, resembling that of *Hypnum stramineum*, and the foliage is of the same colour and texture throughout. This species is never found on walls and roofs of houses, as is commonly the case with *B. argenteum*, but on the sides of streams in mountainous situations.

+ + Leaves acuminate or acute.

§ *Nerve of the leaf disappearing below the point.*

8. *B. crudum;* stems simple, leaves rigid lanceolate the upper ones the narrowest and longest all of them plane serrulate the nerve disappearing below the summit, capsule oblongo-subpyriform cernuous. (Tab. XXVIII.)

Bryum crudum. *Huds. Angl. p.* 491. *Smith, Engl. Bot. t.* 1604. *Fl. Brit. p.* 1361. *Turn. Musc. Hib. p.* 130. *Moug. et Nestl. n.* 512. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 2. *n.* 76. *Drummond, Musc. Scot. v.* 2. *n.* 89. *Brid. Meth. p.* 119. *Arn. Disp. Musc. p.* 48.

Mnium crudum. *Linn.—Hedw. St. Cr. v.* 1. *t.* 37. *Funck, Deutschl. Moose, t.* 32. *f.* 5.—*Dill. Musc. t.* 51. *f.* 70.

Hab. Banks in mountainous countries, and in the crevices of rocks.

Wahlenberg observes justly, that though the portions of the stem above the earth appear simple, many of them really arise from a common root. These stems have a singular appearance, from the leaves, which become gradually longer towards the extremity and are of a shining yellow green, not changing their direction when dry. Their texture resembles that of the foliage of *B. nutans.*

9. *B. carneum;* stems simple, leaves lanceolate reticulated slightly serrulate at the point, nerve disappearing below the summit, capsule obovate pendulous. (Tab. XXIX.)

Bryum carneum. *Linn. Sp. Pl. p.* 1587. *Turn. Musc. Hib. p.* 119. *Smith, Fl. Brit. p.* 1352. *Engl. Bot. t.* 360. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 1. *n.* 99. *Funck, Deutschl. Moose, t.* 29. *f.* 6. *Brid. Meth. p.* 118. *Arn. Disp. Musc. p.* 47.

Bryum delicatulum. *Hedw. St. Cr. v.* 1. *t.* 30.

Bryum pulchellum. *Hedw. St. Cr. v.* 3. *t.* 38. B.? *Schwaegr. Suppl. v.* 1. *P. II. p.* 91. *Brid. Meth. p.* 117.—*Dill. Musc. t.* 50. *f.* 69.

Hab. Banks.

Stems short, rarely exceeding two or three lines, often bearing innovations, and more frequently throwing out sterile shoots from among the roots. The leaves want the bright green colour of the congeners, and exhibit, under the micro-

scope, large reticulations. It is strange that Schwaegrichen should refer for his *B. erythrocarpum* to Mohr, who says only upon that plant "sub nomine *B. erythrocarpi*, Brid. Suppl. MSS. etiam plantulam accepimus in monte Hube, prope Eibeck, a Bridelio lectam, quam a nostro *(B. carneo)* discernere nequimus." We on the other hand, have specimens perfectly agreeing with Schwaegrichen's figure of *B. erythrocarpum*, which we consider only as slender varieties of *B. cæspiticium;* and that author himself says, "differt a *B. cæspiticio* caule tenero, foliorum forma et nervo parum tantum emergente, colore thecæ rufo."

10. *B. argenteum;* stems branched, leaves closely imbricated broadly ovate suddenly and sharply acuminated subserrulate very concave nerve disappearing below the point, capsule ovato-pyriform pendulous. (TAB. XXIX.)

Bryum argenteum. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 122. *Smith, Fl. Brit. p.* 1355. *Engl. Bot. t.* 1602. *Moug. et Nestl. n.* 133. *Funck, Deutschl. Moose, t.* 29. *f.* 1. *Brid. Meth. p.* 118. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 1. *n.* 98. *Drummond, Musc. Scot. v.* 2. *n.* 90. *Arn. Disp. Musc. p.* 45.—*Dill. Musc. t.* 50. *f.* 62.

Bryum lanatum. *Beauv. Brid.*

HAB. On the ground, and on walls and roofs of houses, very common.

This plant has a remarkably silvery appearance, from the upper part of the leaves being scariose and white, whilst the lower part is green. The acuminated points, especially when dry, are patent and resemble hairs. The whole leaf is thin and reticulated, and very different from *B. julaceum*, with which foreign authors have confounded it.

11. *B. Zierii;* stems branched, leaves closely imbricated more or less broadly ovate acuminate very concave reticulated entire nerve running nearly to the point, capsule clavate cernuous. (TAB. XXIX.)

Bryum Zierii. *Dicks. Pl. Crypt. Fasc.* 1. *t.* 4. *f.* 10. *Hedw. Sp. Musc. t.* 44. *f.* 1—4. *Turn. Musc. Hib. p.* 123. *Smith, Fl. Brit. p.* 1356. *Engl. Bot. t.* 1021. *Funck, Deutschl. Moose, t.* 29. *f.* 2. *Hook. Fl. Scot. P. II. p.* 150. *Drummond, Musc. Scot. v.* 2. *n.* 91. *Arn. Disp. Musc. p.* 45.

HAB. Mountains of England, Scotland, and Ireland.

This species, so remarkable for the form of its capsule, resembles the preceding in colour, and in its large reticulation.

§ § *Nerve of the leaf reaching to the point, or beyond it.*

12. *B. roseum;* leaves obovato-spathulate acute serrated undulate nerve running to the point, capsule oblongo-ovate pendulous. (Tab. XXIX.)

Bryum roseum. *Schreb. Fl. Lips. p.* 84. *Turn. Musc. Hib. p.* 132. *Smith, Fl. Brit. p.* 1370. *Engl. Bot. t.* 2395. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 2. *n.* 76. *Drummond, Musc. Scot. v.* 2. *n.* 92. *Brid. Meth. p.* 119. *Arn. Disp. Musc. p.* 44.

Mnium roseum. *Hedw.—Funck, Deutschl. Moose, t.* 32. *f.* 13. *Schwaegr. Suppl. v.* 1. *P. II. p.* 135.

Bryum truncorum, and Domingense. *Brid. Meth.—Dill. Musc. t.* 52. *f.* 77.

Hab. Banks and on heaths, especially in submountainous countries; rare in fructification. On banks near Meavy, Devonshire, in fruit.—*Rev. J. S. Tozer.*

The stems of this fine species are branched below the surface of the ground; the rest of them is at the base bare of foliage; above, the leaves are spread out in a stellated manner, or, as Mr. Turner well observes, so as to resemble an expanded rose. We are indebted for our fructified specimens to Mr. Drummond, who found them near Cork.

13. *B. capillare;* stems short, leaves obovate twisted when dry entire their nerve produced into a hair-like point, their margins slightly thickened, capsule oblong pendulous. (Tab. XXIX.)

Bryum capillare. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 120. *Smith, Fl. Brit. p.* 1357. *Engl. Bot. t.* 2007. *Schwaegr. Suppl. t.* 74. *Moug. et Nestl. n.* 33. *Brid. Meth. p.* 118. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 2. *n.* 78. *Drummond, Musc. Scot. v.* 2. *n.* 93. *Arn. Disp. Musc. p.* 45.

Bryum annotinum. *Engl. Bot. t.* 1862. *(fructified specimens.)*

Bryum stellare. *Engl. Bot. t.* 2434.?—*Dill. Musc. t.* 50. *f.* 67.

Hab. Heaths, rocks, walls, &c.

This has been often, we believe, taken for *B. cæspiticium;* but the greater length of its capsule, its obovate leaves, twisted when dry, together with the hair-like point formed by the excurrent nerve, will always distinguish it.

We think the *B. stellare* of *Engl. Bot.* belongs to this species. It does not accord with the true *stellare*, which has not, to our knowledge, been yet found in Britain.

14. *B. cæspiticium*; stems short, leaves ovate acuminated entire or very obscurely serrated at the points their margins slightly recurved the nerve reaching to or beyond the point, capsule between ovate and pyriform pendulous. (Tab. XXIX.)

α. major.

Bryum cæspiticium. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 120. *Smith, Fl. Brit. p.* 1354. *Engl. Bot. t.* 1904. *Funck, Deutschl. Moose, t.* 30. *f.* 16. *Hook. Fl. Scot. P. II. p.* 150. *Hobson, Brit. Mosses, v.* 1. *n.* 100. *Brid. Meth. p.* 118. *(also* B. Funckii, lacustre, sanguineum, radiculosum? canariense? *and* subrotundum? *of the same author.)*

Bryum Wahlenbergii. *Schwaegr. Suppl. t.* 70.?

Mnium lacustre. *Schwaegr. Suppl. t.* 77. *Funck, Deutschl. Moose, t.* 32. *f.* 3.

Bryum erythrocarpum. *Schwaegr. Suppl. t.* 70.? *Funck, Deutschl. Moose, t.* 29. *f.* 12. *Brid. Meth.—Dill. Musc. t.* 50. *f.* 66.

Pohlia imbricata. *Schwaegr. Suppl. v.* 1. *P. II. p.* 71. *t.* 64.

β. minor.

Bryum bicolor. *Dicks. Pl. Crypt. Fasc.* 4. *p.* 16. *Turn. Musc. Hib. p.* 11. *f.* 2. *Smith, Fl. Brit. p.* 1355. *Engl. Bot. t.* 1601.

Hab. Banks, walls, and roofs of houses, very common.

"Admodum polymorpha species pro solo natali. Viginti ad minimum habitu summopere diversas formas, a variis pro novis speciebus transmissas, habemus, quæ in genere foliis magis minusve erectis, latioribus, angustioribus, ut mox ovatæ, mox lanceolatæ formæ magis accedant, acumine et apiculo diversissimæ longitudinis, seta longiore brevioreve, etiam sporangio et operculo parum ab invicem recedunt; sed firmos limites nullos hasce discernendi invenimus; nec dubiis speciebus perplexissimum genus augere cupivimus." In all these remarks of the excellent Mohr, we are disposed fully to acquiesce; and we ought, perhaps, to unite the following species with this, since we know of scarcely any character of importance but the different shape of its capsule. With regard to *B. Wahlenbergii*, we have been induced to refer it to this species from the shortness of its capsule, and the exact conformity of its leaves, (according to Schwaegrichen's figures,) with many of those in

B. cæspiticium, notwithstanding that the descriptions of Mohr, and of Schwaegrichen himself, are somewhat at variance with the above mentioned figures. *Mnium lacustre*, also of Schwaegrichen, has, in all its essential points, the most perfect agreement with our plant; and though Mohr at first takes it up as a species, he afterwards is disposed to alter his opinion in a note at page 488 of his *Fl. Cr. Germ.*—*B. erythrocarpum* differs somewhat in the form of its capsule, which is by no means pyriform, but its leaves exactly accord with those of *B. cæspiticium*.

15. *B. turbinatum*; stems short branched with innovations, leaves ovate acuminated nearly entire the margins slightly recurved the nerve running beyond the points, capsule elongato-pyriform pendulous. (Tab. XXIX.)

Bryum turbinatum. *Swartz, Musc. Suec. p.* 49. *Turn. Musc. Hib. p.* 126. *Smith, Fl. Brit. p.* 1366. *Engl. Bot. t.* 1572.? *Moug. et Nestl. n.* 222. *Brid. Meth. p.* 118. *Hook. Fl. Scot. P. II. p.* 151. *Hobson, Brit. Mosses, v.* 1. *n.* 101. *Drummond, Musc. Scot. v.* 2. *n.* 94. *Funck, Deutschl. Moose, t.* 30. *f.* 20. *Arn. Disp. Musc. p.* 46. *Schwaegr. Suppl. v.* 1. *P. II. p.* 19.

Mnium turbinatum. *Hedw. St. Cr. v.* 3. *t.* 8.

Pohlia inclinata. *Schwaegr. Suppl. t.* 63.

Bryum boreale. *Schwaegr. Suppl. t.* 69. *Brid. Meth. p.* 117.

Bryum pallescens. *Schwaegr. Suppl. v.* 1. *P. II. p.* 109. *t.* 75. *Moug. et Nestl. n.* 727.

Bryum pallens. *Schwaegr. Suppl. v.* 1. *P. II. p.* 111. *Brid. Meth. p.* 117. *Moug. et Nestl. n.* 728. *Funck, Deutschl. Moose, t.* 31. *f.* 23.

Bryum flagellare. *Funck, Deutschl. Moose, t.* 30. *f.* 17.

Bryum interruptum. *Smith, Fl. Brit. p.* 1363. *Engl. Bot. t.* 2371.?

Bryum longisetum. *Schwaegr. Suppl. v.* 1. *P. II. p.* 109. *t.* 75. *Brid. Meth. p.* 117.

Bryum nigricans. *Dicks.*—*Smith, Fl. Brit. p.* 1363. *Engl. Bot. t.* 1528. *Brid. Meth. p.* 120.

Webera intermedia. *Schwaegr. Suppl. v.* 1. *P. II. p.* 67. *t.* 65.—*Dill. Musc. t.* 51. *f.* 74.

Bryum Schleicheri. *Schwaegr. Suppl. v.* 1. *P. II. p.* 113. *t.* 73.? *Funck, Deutschl. Moose, t.* 31. *f.* 25.?

Bryum annotinum? *Hedw. Sp. Musc. p.* 123. *t.* 43. *Smith, Fl. Brit. p.* 1358.? *Engl. Bot. t.* 1862. *(barren magnified figure.) Funck, Deutschl. Moose, t.* 29. *n.* 8.

Hab. In wet, sandy, and stony places, chiefly in mountainous countries.

We have no doubt of this being the "*B. palustre complicatum rubens, capsulis turbinatis pendulis*" of Dillenius, and this is the authority for Hedwig's *Mnium turbinatum*. How far it merits to be distinguished as a species from *B. cæspiticium* on the one hand, or *B. ventricosum* on the other, must still remain a question. Mohr is disposed to think them the same, and also, that *Pohlia inclinata* is no other than *Webera intermedia*, of which he says "nec forte ab insequente specie (*B. cæspiticio*) separata esset, si rite peristomium esset investigandum." In another place he doubts if *B. boreale* and *B. pallens* are different from *B. cæspiticium;* and Schwaegrichen informs us that his *B. pallescens* was considered by Mohr as the same with *B. boreale*. Of these plants, indeed, we are so unfortunate as to possess no authentic specimens; but we think that Mohr's opinion upon them is fully confirmed by the figures above quoted, and lately published by Schwaegrichen; for they differ in no essential point from our *B. turbinatum*, which, as we have already observed, is by Mohr united with *B. cæspiticium*. We have further added to our list of synonyms the *B. Schleicheri* and *B. longisetum;* the former, indeed, approaching nearer to *B. ventricosum* in its leaves, but agreeing with our plant in its capsules; thus being, as it were, exactly intermediate; and the latter differing from *B. turbinatum* in nothing but the length of the fruitstalk.

All the states of *B. turbinatum* are more or less furnished with innovations, as may be expected from plants growing in wet places, and the stems vary much in their length. The capsule, too, varies somewhat in figure, but is always pyriform; and the whole plant is subject to great difference in colour, according to its exposure and to the soil in which it grows.

16. *B. nutans;* stems short, leaves erect lanceolate acuminated serrated above nerve reaching to the point, capsule oblongo-pyriform pendulous. (Tab. XXIX.)

Bryum nutans. *Schreb. Fl. Lips. p.* 81. *Turn. Musc. Hib. p.* 117. *Smith, Fl. Brit. p.* 1347. *Engl. Bot. t.* 1240. *Moug. et Nestl. n.* 220. *and n.* 134. (B. cæspiticium.) *Hook. Fl. Scot. P. II. p.* 151. *Hobson, Brit. Mosses, v.* 1. *n.* 107. *Drummond, Musc. Scot. v.* 1. *n.* 99. *Arn. Disp. Musc. p.* 47.

Webera nutans. *Hedw. St. Cr. v.* 1. *t.* 4. *Funck, Deutschl. Moose, t.* 25. *f.* 7.

Bryum compactum. *Smith, Engl. Bot. t.* 1257.?

Bryum Wahlenbergii. *Funck, Deutschl. Moose, t.* 29. *f.* 7. *(not of Schwaegr.)—Dill. Musc. t.* 50. *f.* 61.

HAB. Walls and heaths, principally in mountainous regions.

This species is remarkable, when the capsules are mature, for the bright colour of its fruitstalks, and for the narrow and glossy leaves, which, in the barren shoots, are almost linear, and are always at the extremity of the stems the least broad. The capsules are subject to vary somewhat in form; but it is to be observed that they are more pyriform as they advance in age, and when in a dried state.

17. *B. elongatum;* stems short, leaves erect elongato-lanceolate acuminated serrated nerve reaching to the point, capsule elongato-clavate inclined rarely drooping. (TAB. XXX.)

Bryum elongatum. *Dicks. Pl. Crypt. Fasc.* 2. *p.* 8. *Turn. Musc. Hib. p.* 114. *Smith, Fl. Brit. p.* 1349. *Engl. Bot. t.* 1603. *Hook. Fl. Scot. P. II. p.* 151. *Hobson, Brit. Mosses, v.* 1. *n.* 102. *Drummond, Musc. Scot. v.* 1. *n.* 100. *Arn. Disp. Musc. p.* 47.

Pohlia elongata. *Hedw. St. Cr. v.* 1. *t.* 36. *Brid. Meth. p.* 115.

Pohlia minor. *Schwaegr. Suppl. t.* 64. *Brid. Meth. p.* 115.

Pohlia acuminata. *Funck, Deutschl. Moose, t.* 26. *f.* 3.

Webera alpina. *Funck, Deutschl. Moose, t.* 25. *f.* 9.

Bryum longicollum. (Webera, Hedw.) *Swartz, Musc. Suec. t.* 6. *f.* 13.

Bryum cylindricum. *Dicks. Pl. Crypt. Fasc.* 4. *t.* 11. *f.* 4. *Smith, Fl. Brit. p.* 1351.

HAB. Mountains, especially in clefts of the rocks, and in caves.

We can perceive no difference between Mr. Dickson's *B. cylindricum* and his *elongatum;* and the *B. longicollum* of Swartz, judging from the specimens we have received of it, is only a large variety; as *Pohlia minor* is a smaller state of the plant. Of this latter we have authentic specimens, in which the leaves are often as narrow as in the common appearance.

B. elongatum is nearly allied to *B. crudum*, but that species has much longer and more leafy stems, with an evanescent nerve, and a shorter capsule. In both, the foliage possesses the

same rigid and glossy texture, and in this respect they are allied to *B. nutans*. The peristome is that of a *Pohlia*.

18. *B. alpinum*; stems elongated rigid branched, leaves closely imbricated erect lanceolate somewhat obtuse subserrulate at the apex margins revolute nerve reaching to the points, capsule oblongo-ovate pendulous. (Tab. XXVIII.)

Bryum alpinum. *Linn. Mant. v. 2. p. 309. Turn. Musc. Hib. p. 125. Smith, Fl. Brit. p. 1358. Engl. Bot. t. 1263. Moug. et Nestl. n. 221. Schwaegr. Suppl. t. 73. Funck, Deutschl. Moose, t. 29. f. 11. Hook. Fl. Scot. P. II. p. 151. Hobson, Brit. Mosses, v. 2. n. 79. Arn. Disp. Musc. p. 47.—Dill. Musc. t. 50. f. 64.*

Hab. On rocks in subalpine countries, common.

This species is best known by its deep shining purple colour, its rigid stems and leaves, which latter are straight, as well when dry as when moist. It is, nevertheless, difficult to form a specific character that will separate it from some of the varieties of *B. ventricosum*. We do not observe the leaves to be "octofariam imbricata," as Schwaegrichen describes them.

19. *B. ventricosum*; stems elongated branched with innovations, leaves oblong acuminated scarcely serrulate margins recurved nerve reaching beyond the point, capsule oblongo-ovate pendulous. (Tab. XXX.)

Bryum ventricosum. *Dicks. Pl. Crypt. Fasc. 1. p. 4. Turn. Musc. Hib. p. 126. Smith, Fl. Brit. p. 1365. Engl. Bot. t. 2270. Hook. Fl. Scot. P. II. p. 151. Hobson, Brit. Mosses, v. 1. n. 103. Arn. Disp. Musc. p. 46.*

Bryum bimum. *Schreb. Fl. Lips. p. 83. Turn. Musc. Hib. p. 127. Smith, Fl. Brit. p. 1365. Engl. Bot. t. 1518. Moug. et Nestl. n. 223. Funck, Deutschl. Moose, t. 31. f. 22. Brid. Meth. p. 118.*

Bryum cubitale. *Dicks. Pl. Crypt. Fasc. 2. t. 5. Smith, Fl. Brit. p. 1364. Engl. Bot. t. 2554. Brid. Meth. p. 108.*

Mnium pseudo-triquetrum. *Hedw. St. Cr. v. 3. t. 7.*

Bryum pseudo-triquetrum. *Brid. Meth. p. 118. Funck, Deutschl. Moose, t. 31. f. 21.—Dill. Musc. t. 51. f. 72.*

Hab. Marshy ground, and in wet places in the crevices of rocks.

We have carefully examined authentic specimens of all the synonyms above quoted, and have no hesitation in reducing them to one species. The stems are from two to four inches or more in length, including the innovations, which are very

abundant, often of a deep brown or reddish colour, in which the foliage partakes to a degree. The leaves are more or less crowded, generally erecto-patent, the nerve reddish, the margins revolute, the base decurrent, almost as much so as in *Mnium Duvalii* of *Schwaegr. Suppl. t.* 79. which, perhaps, may be only a variety of our plant.

It must be allowed that the differences between this moss and *B. cæspiticium* are almost insufficient, and that it is more distinguishable by its larger size, proliferous habit, and brown or purple hue, than by any more essential characters; all of which may be fairly attributable to the place of growth, whilst the other affects dry banks and walls; and we should willingly have reduced these species to varieties, if the example of all preceding Muscologists had not forbidden it; not one of them having expressed the least doubt as to the identity.

We wish also that we could discover characters that would better indicate a specific distinction between this species and the preceding *B. alpinum;* which, always growing upon exposed rocks, has a dense habit and is never proliferous. The place of growth may account also for the more erect, rigid foliage; but this is certainly narrower than in our present plant, and the capsule is usually shorter.

20. *B. demissum;* stems very short branched, leaves ovate cuspidato-acuminate reticulated, their nerve excurrent, fruitstalk arched, capsule curved and pyriform pendulous, the mouth oblique. (SUPPL. TAB. VI.)

Bryum demissum. *Hook. Musc. Exot. v.* 2. *t.* 99. *Greville, Scot. Crypt. Fl. v.* 2. *t.* 92. *Arn. Disp. Musc. p.* 46.

Bryum curvulum. *Schleicher. Cat.*

Meesia demissa. *Hoppe et Hornsch. MSS. Funck, Deutschl. Moose, t.* 28. *n.* 4.

Timmia. *Nov. Sp. Schmidt, MSS.*

HAB. Rocks upon Craigcalliach and several other of the Breadalbane mountains, always in very elevated and very exposed situations.

This curious and very distinct moss, although inhabiting several distant parts of Europe, yet seems to be of very local occurrence. We know that it is found in Switzerland, in Savoy, in Salzburg, in Norway, and in Britain; every where in

very alpine situations, and in the latter country only amongst the Breadalbane range of mountains.

Our reasons for not retaining this plant either in the genus *Meesia* or *Timmia*, are given in the *Exotic Flora*; the capsule, however, we must allow, has much the habit of the other Hedwigian *Meesiæ*. The outer peristome is equal in length to the inner one, and the latter has the ciliary processes standing in pairs and united by transverse bars.

†† *Leaves with their margins evidently thickened.*

§ *Leaves without denticulations.*

21. *B. punctatum*; stems elongated, leaves obovato-rotundate very obtuse reticulated their margins thickened entire the nerve disappearing below the point, capsule ovate pendulous, lid shortly rostrate. (Tab. XXX.)

Bryum punctatum. *Schreb. Fl. Lips. p.* 85. *Turn. Musc. Hib. p.* 132. *Smith, Fl. Brit. p.* 1368. *Engl. Bot. t.* 1183. *Moug. et Nestl. n.* 136. *Hook. Fl. Scot. P. II. p.* 151. *Hobson, Brit. Mosses, v.* 1. *n.* 104. *Drummond, Musc. Scot. v.* 2. *n.* 93. *Brid. Meth. p.* 119. *Arn. Disp. Musc. p.* 45.

Bryum ellipticum. *Beauv.—Brid. Meth. p.* 119.

Mnium punctatum. *Hedw.—Funck, Deutschl. Moose, t.* 33. *f.* 16.

Mnium serpyllifolium. *a. Linn. Sp. Pl. p.* 1577.—*Dill. Musc. t.* 53. *f.* 81.

Hab. Boggy places, particularly among the roots of Alders, and other marsh trees.

The leaves of this moss are among the largest in the Order *Musci*, and approaching nearly to those of *Cinclidium stygium*. The present and all the following species of *Bryum* agree in having the inner peristome of a firm and rigid texture, while the outer teeth are prominent.

§§ *Leaves denticulated.*

22. *B. ligulatum*; stems elongated, leaves undulate ligulate reticulated their margins thickened denticulate the nerve reaching a little beyond the point, capsule ovate pendulous, lid conical. (Tab. XXX.)

Bryum ligulatum. *Schreb. Fl. Lips. p.* 84. *Smith, Fl. Brit. p.*

1371. *Engl. Bot. t.* 1449. *Hook. in Fl. Lond. ed.* 2. *(with a fig.) Moug. et Nestl. n.* 420. *Hook. Fl. Scot. P. II. p.* 151. *Hobson, Brit. Mosses, v.* 1. *n.* 105. *Drummond, Musc. Scot. v.* 2. *n.* 96. *Arn. Disp. Musc. p.* 44.

Bryum undulatum. *Turn. Musc. Hib. p.* 133.

Mnium undulatum. *Hedw.—Funck, Deutschl. Moose, t.* 33. *f.* 14.

Mnium serpyllifolium. *β. Linn. Sp. Pl. p.* 1578.—*Dill. Musc. t.* 52. *f.* 76.

HAB. Moist banks and in woods, common.

Stems creeping and branched beneath the surface of the ground; branches erect, three or four inches in length, leafy; the leaves very large towards the extremities of the plant. The sterile plants are procumbent. It often happens that many fruitstalks arise from the same point.

23. *B. rostratum;* stems elongated, leaves broadly ovate reticulated their margins thick obtuse denticulated the nerve reaching a little beyond the point, capsule ovate pendulous, lid rostrate. (TAB. XXX.)

Bryum rostratum. *Schrad. Spicil. p.* 72. *Smith, Fl. Brit. p.* 1369. *Engl. Bot. t.* 1475. *Moug. et Nestl. n.* 419. *Hook. Fl. Scot. P. II. p.* 151. *Drummond, Musc. Scot. v.* 2. *n.* 97. *Arn. Disp. Musc. p.* 45.

Bryum longirostrum. *Brid. Meth. p.* 119.

Mnium rostratum. *Schwaegr. Suppl. v.* 1. *P. II. p.* 136. *t.* 79. *Funck, Deutschl. Moose, t.* 13. *f.* 15. *Dill. Musc. t.* 53. *f.* 80.

HAB. Subalpine countries, Yorkshire.—*Rev. J. Dalton.*

This species approaches most nearly to *B. punctatum;* but the whole plant is smaller, rarely exceeding an inch in height; the leaves are narrow and denticulate, of a softer texture, and the nerve runs beyond the extremity of the leaf, so as to form a short cuspidate point; the lid, too, has a longer beak. Calyptra very pale coloured; fruitstalks from one to five.

24. *B. marginatum;* stems elongated, leaves ovate acute reticulated their margins thickened serrated nerve reaching a little beyond the point, capsule ovate pendulous, lid shortly rostrate. (TAB. XXXI.)

Bryum marginatum. *Dicks. Pl. Crypt. Fasc.* 2. *t.* 5. *f.* 1. *Turn. Musc. Hib. p.* 129. *Smith, Fl. Brit. p.* 1362. *Engl. Bot. t.* 1493. *Hook. Fl. Scot. P. II. p.* 152. *Drummond, Musc. Scot. v.* 2. *n.* 98. *Arn. Disp. Musc. p.* 44.

Bryum serratum. *Schrad.*

Mnium serratum. *Schwaegr. Suppl. t.* 78. *Funck, Deutschl. Moose, t.* 32. *f.* 9.

HAB. Woods and shaded banks in the north of England and Ireland. Not uncommon in Scotland.

Whole plant, when growing, of a very yellowish hue. Stems simple, about an inch high. Leaves of a lurid green, especially if dry; when seen under a microscope the margin and nerve are of a deep blood colour, and the veil is of a red or orange hue, which renders the moss very discernible at first sight.

We are indebted for many important remarks relative to the *serpyllifolia* tribe of the *Brya* to our kind friend the Rev. Mr. Dalton, as well as for excellent specimens of all the species.

25. *B. hornum;* stems elongated, leaves lanceolate acute reticulated their margins thickened denticulate nerve generally disappearing below the summit, capsule oblongo-ovate pendulous, lid hemispherical mucronulate. (TAB. XXXI.)

Bryum hornum. *Schreb. Fl. Lips. p.* 83. *Turn. Musc. Hib. p.* 128. *Smith, Fl. Brit. p.* 1360. *Engl. Bot. t.* 2271. *Moug. et Nestl. n.* 34. *Hook. Fl. Scot. P. II. p.* 152. *Hobson, Brit. Mosses, v.* 1. *n.* 106. *Drummond, Musc. Scot. v.* 2. *n.* 100. *Brid. Meth. p.* 119. *Arn. Disp. Musc. p.* 44.

Mnium hornum. *Linn. Sp. Pl. p.* 1576. *Hedw.—Funck, Deutschl. Moose, t.* 32. *f.* 7.—*Dill. Musc. t.* 51. *f.* 71.

HAB. Marshy places and in wet woods.

Stems simple, erect, densely tufted, from two to three inches in length. Leaves with their margins and nerve reddish; the upper ones, in the fertile plant, very narrow, almost linear. Lid hemispherical with a short point, in which it differs from the following species. Whole plant of a yellow lurid green colour.

26. *B. cuspidatum;* stems elongated, leaves obovate acute reticulated their margins thickened denticulated above nerve running beyond the point, capsule ovate pendulous, lid conico-hemispherical obtuse. (TAB. XXXI.)

Bryum cuspidatum. *Schreb. Fl. Lips. p.* 84. *Turn. Musc. Hib. p.* 131. *Smith, Fl. Brit. p.* 1368. *Engl. Bot. t.* 1474. *Moug. et Nestl. n.* 621. *Hook. Fl. Scot. P. II. p.* 152. *Drummond, Musc. Scot. v.* 2. *n.* 99. *Arn. Disp. Musc. p.* 45.

Mnium cuspidatum. *Hedw. Sp. Musc. t.* 45 *f.* 5—8. *Funck, Deutschl. Moose, t.* 33. *f.* 11.

Mnium serpyllifolium. β. *Linn. Sp. Pl. p.* 1577.—*Dill. Musc. t.* 53. *f.* 79. A—L.

HAB. On woods and on walls in shady situations.

Besides the difference alluded to under the last described species, between this moss and *B. hornum*, we may remark, that the plant is smaller, lax in its mode of growth; with creeping shoots, which, as Mr. Dalton observes, take root at the extremity; with broader, almost always ovate and fewer leaves, the perichætial ones alone ovate or narrow-ovate, that their texture also is softer, so that they become crisped when dry; whereas, those of *B. hornum* are nearly as erect in that state as when growing. The foliage is altogether of a pale but bright green.

Mr. Dalton, whose late residence at Copgrove in Yorkshire afforded him excellent opportunities for examining the mosses of this family, informs us that he never met with a specimen of the present species with more that one fruitstalk, and he is of opinion that the plant of Dillenius, *t.* 53. *f.* 79. M. is a different species. Schwaegrichen confirms this supposition, and has quoted it under his *Mnium affine*, of which he says "*Mnio cuspidato* valde similis sed caulis 2—4 uncialis, valde tomentosus; folia latiora et minus acuminata, sæpe obtusa cum mucrone, serrato-ciliata, ciliis patentibus; setæ 2—3 uncialis, plerumque quinque; quatuor, tres, rare una;" and to this he refers the *Mnium cuspidatum* of the *Species Muscorum*, excluding the Dillenian synonyms A—L. Whether a good species or not, we know no instance of its being found in Britain. Dillenius received his specimen from Vaillant.

END OF THE MUSCI.

APPENDIX.

HEPATICÆ.—Juss. De Cand.

(Part of *Algæ, Linn.—Calyptratæ, Deoperculatæ, Mohr.*)

Fructification generally of two kinds; 1st, *Capsules*, in an early stage, covered with a *calyptra*, which is tipped with an apparent *style*, often surrounded by a *perianth* or *calyx*, at length bursting the calyptra irregularly, and rising on a peduncle, and opening at the extremity with two or four or many valves, destitute of operculum, bearing within numerous seeds, mixed (except in *Riccia*, and perhaps *Sphærocarpus*,) with spiral filaments; 2dly, oblong or mostly rounded, and frequently shortly pedunculated, reticulated bodies, *Anthers?* containing a very minutely granulated substance which escapes by an aperture formed at the extremity.

Minute *plants* frequently frondose, sometimes, in *Jungermannia* for instance, leaf-bearing; the leaves often divided, never really nerved. From various parts of the fronds or leaves, *gemmæ* are produced in many instances. Their substance is loosely cellular in general, easily reviving, after being dried, by the application of moisture. Sometimes the areolæ of the cells have an evident pore, as in *Marchantia* and *Targionia*, and then the plants, after being once dried, are found to revive very slowly.

I. RICCIA.

Capsule sphærical, immersed in the frond, indehiscent, crowned with a *style*, which is alone protruded.

We are but imperfectly acquainted with the fructification of the plants attributed to this genus. In *R. crystallina*, we can discover no *calyptra*; it is from the general habit of the individuals composing it that we refer them to the *Hepaticæ*; and, indeed, were it not that the herbaceous texture assimilated them to this family, we should be almost induced with Hedwig to rank them with the *Algæ*. The *fructification* seems to consist of a sphærical, pellucid, membranous bag, tipped with a mucro, considered by many to be a *style*, and filled with rather large, dark brown, minutely hispid, triangular *granules* or *seeds* which, by their pressure, give to the sides of the capsule, externally, a tuberculated appearance. The *seeds* escape without any apparent regular dehiscence of the surrounding membrane, but rather on its natural decay.

1. *R. crystallina*; frond carnose ovato-oblong bi-trilobed, the divisions dichotomous.

α. frond fleshy glaucous channelled, segments acute.

Riccia glauca. *Linn. Sp. Pl. p.* 1605. *Schmid. Ic. p.* 176. *t.* 44. *f.* 1. *Engl. Bot. t.* 2546. *Hook. Fl. Scot. P. II. p.* 110.

Riccia minima. *Linn. Sp. Pl. p.* 1605. *Schmid. Ic. t.* 45. *f.* 3. *Dill. Musc. t.* 78. *f.* 10, 11.

β. frond thin nearly plane yellowish green, segments obtuse.

Riccia crystallina. *Linn. Sp. Pl. p.* 1605. *Schmid. Ic. t.* 45. *f.* 5. *Dill. Musc. t.* 78. *f.* 12.

HAB. α. on banks in rather dry situations.—β. in moist spots, especially on the mould of garden pots in the greenhouse and stove; Bot. Garden, Glasgow.

We have carefully examined numerous specimens, both in a fresh and dried state, of the individuals named in the above synonyms, and we are decidedly of opinion that they are merely varieties of the same species, depending, perhaps, entirely on age and place of growth. That which we have called α. (including the *glauca* and *minima* of Linnæus, the difference between them depending solely on age and size,) grows generally on banks, in comparatively dry and exposed situations; is usually small, thick and fleshy, but little divided, grooved throughout the length of its superior surface, and of a remarkably blueish, or glaucous green colour. Our var. β. which has commonly gone under the name of *R. crystallina*,

and which grows in more shady and moist situations, has the frond generally longer, broader, much thinner, nearly plane, with segments more numerous and very obtuse, the colour by no means glaucous, rather, perhaps, inclining to yellowish green. *Frond* growing in orbicular tufts radiating from the centre. The fronds, in all, when seen in a fresh state, from the delicate and pellucid nature of the cellules, which are particularly convex, have a remarkably crystalline appearance, not unlike that of *Mesembryanthemum crystallinum;* which has determined us to prefer, of the equally ancient names, that of *crystallina.*

2. *R.? fluitans;* aquatic, floating, frond thin repeatedly forked, with linear obtuse segments generally notched at the extremity.

Riccia fluitans. *Linn. Sp. Pl. p.* 1606. *Engl. Bot. t.* 251. *Weber, Prodr. Hepat. p.* 117. *Schwaegr. Prodr. Hepat. p.* 38.—*Dill. Musc. t.* 74. *f.* 17.

HAB. Stagnant waters, floating upon the surface. Not found in Scotland.

Fronds varying from half an inch to two inches in length, yellow green, repeatedly divided in a dichotomous manner, the segments linear, not more than half a line in breadth, slightly thickened in the centre, as if furnished with an obscure midrib, grooved in the upper surface, when dry, thin, semipellucid; reticulation indistinct; the extremities obtuse, occasionally sphacelated, and opaque, having the appearance of spots, which some have considered an incipient fructification, but we can find no peculiar organization about them, nor has any thing like real fruit been discovered. The plant commonly grows upon the surface of the water in ponds and ditches, where it assumes its largest size, and is quite destitute of fibrous radicles; not unfrequently, however, perhaps left by the subsiding of the water, it is found upon the soil; it is then smaller, with the segments shorter, throwing out numerous fibrous roots from its whole under surface, with which it adheres firmly to the place of growth, and has then very much the appearance of some of the narrower and thinner varieties of *R. crystallina.* Still we think the nature and reticulation of the frond are different; but farther observations are required to decide this point. Ehrhart, in his Beitrage, v. III. p. 81.,

says, "Capsula in inferiori frondis pagina plurimum haud procul ab ejus apice, sessilis, globosa, evalvis, gallis minoribus foliorum *Glechomæ hederaceæ* similis, continens semina 20—30 alba et fusca," while Mr. Alex. Braun of Carlsruhe, in his *Observations on some Hepaticæ* in the *Botanische Zeitung* for 1821, has found similar bodies upon the *Riccia canaliculata* of Hoffmann, which is most assuredly but a variety of *R. fluitans*, and has hence been led to refer these plants to his new genus *Ricciella*, for which he has the following character:—"Capsula in inferiori frondis pagina, viridi-luteola, pellucida, globosa, per lentem rugulosa, semper inaperta. *Sporæ* gelatinosæ, albæ, tum albæ fuscis mixtæ." Such a character, however, we must confess, is too vague to satisfy us as to the propriety of its constituting a distinct genus.

3. *R. natans;* frond obovate or inversely cordate, once or twice lobed, clothed beneath and at the margin with numerous long pendent denticulated flat fimbriæ.

Riccia natans. *Linn. Syst. Nat. et* 12. *v.* 2. *p.* 708. *Engl. Bot. t.* 252. *Weber, Prodr. Hepat. p.* 117.

Riccia capillata. *Schmid. Ic. t.* 74.—*Dill. Musc. t.* 78. *f.* 18.

HAB. Stagnant pools, rare, England.

Fronds always found floating, about half an inch in length, between fleshy and membranaceous, pale green above, with a slight depression or groove in the centre, the cells large, each apparently subdivided into smaller cellules, the margin and whole under side are clothed with numerous pendent, linear, membranaceous, mostly dark purple, strongly veined fimbriæ. We have never been able to detect any fructification on British specimens, but we have had the satisfaction of receiving American specimens with capsules from Professor Torrey of the Military Academy, West Point, New York. They appear to be exactly similar to those of *R. crystallina*.

4. *R. spuria;* fronds membranaceous lobed pellucid, fructification beneath the sinuses of the lobes solitary exserted turbinate toothed.

Riccia spuria. *Dicks. Pl. Crypt. Fasc.* 4. *p.* 20. *t.* 11. *f.* 16. *Hook. Fl. Scot. P. II. p.* 110.

HAB. Turfy marshes among the Scottish mountains.—*Mr Dickson.*

Of this plant we know nothing but from Dickson's figure and description above quoted. It seems very ill to accord with *Riccia.*

II. SPHÆROCARPUS.

Capsules? sphærical surrounded by an obovate *Calyx,* open at the summit.

1. *S. terrestris.*

Sphærocarpus terrestris. *Engl. Bot. t.* 299. *Schwaegr. Prodr. Hepat. p.* 35. *Weber, Prodr. Hepat. p.* 109.

Targionia sphærocarpa. *Dicks. Pl. Crypt. Fasc.* 1. *p.* 8.

Sphærocarpus. *Schmid. Ic.* 28. *f.* 11. *Mich. Gen. t.* 3.—*Dill. Musc. t.* 78. *f.* 17.

HAB. In fields, especially Clover layers; plentiful in Norfolk.

is with great regret that we give so imperfect an account of this plant, which, though growing plentifully in Norfolk and Suffolk, our own neighbourhood, we have never been able to detect in perfect fructification. Various, indeed, have been the accounts given of it, especially by Schmidel, Sprengel, and Weber; without, however, entering into a discussion of their correctness, we shall simply state what we have hitherto observed.

The *fronds* grow single or collected together in small patches upon the ground, each from a fourth to half an inch in length, plane, slightly waved, the margin variously lobed, lobes short and rounded; the *texture* thin, beautifully reticulated, the colour pale green, inclining to glaucous, the under side adhering to its place of growth by abundant fibrous *radicles;* the whole of its superior surface, except towards the margin, is covered with numerous obovate *follicles* or *calyces,* of the same texture and colour as the frond, varying much in dimensions, the largest and oldest ones about the size of a small mustard seed, truncated at the top and perforated; the aperture entire at the margin. Within these, at the base, as well in the small as larger ones, we find sometimes from 2—5 extremely minute, linear, *pistilliform bodies,* at other times, one of these is oblong, swollen, and lengthened, and exactly resem-

bling the young germen of a *Jungermannia*. Again, and much more rarely, we have found one of these pistilliform bodies enlarged into a perfectly sphærical form, tipped with a short, slender style, the whole not larger than an eighth of the calyx; the contents of so small a body we could not satisfactorily ascertain, but they appeared, when pressed out, to consist of a pulpy substance.

We can state nothing more respecting the fructification, from our own observation. Micheli informs us, that the calyces contain a single sphærical capsule, filled with seeds, but destitute of filaments. Smith has figured a similar large sphærical body at the bottom of the calyx, but has not noticed its contents. Now, if these capsules were similar to those of *Riccia crystallina*, that is to say, if the seeds were covered with a single membrane, we presume the style or mucro which we have seen in the young state of the fructification, would be apparent in the more perfect fruit; yet neither Micheli nor Smith have represented it.

III. ANTHOCEROS.

Capsule pedunculated, linear, bi-valved, having a central *columella*, to which the *seeds* are attached, and arising from a tubular perianth.

1. *A. punctatus;* frond obovato-oblong flattish waved and cut at the margin.

Anthoceros punctatus. *Linn. Sp. Pl. p.* 1606. *Schmid. Ic. t.* 47. *Engl. Bot. t.* 1537. *Schwaegr. Prodr. Hepat. p.* 35. *Weber, Prodr. Hepat. t.* 112.—*Dill. Musc. t.* 68. *f.* 1.

Anthoceros lævis. *Linn. Sp. Pl. p.* 1606. *Schwaegr. Prodr. Hepat. p.* 35. *Schmid. Ic. t.* 19.

Anthoceros major. *Mich. Gen. t.* 7. *f.* 1. *Engl. Bot. t.* 1538.—*Dill. Musc. t.* 68. *f.* 2.

HAB. By the sides of ditches and water courses, in very moist situations.

Fronds from one half to three fourths of an inch in length, procumbent, often forming orbicular imbricated patches, radiating from the centre; each more or less of an obovato-oblong figure, plane or slightly waved on the surface; the extremities

somewhat dichotomously divided into short, rounded segments, which are waved and broadly notched at the margin, sometimes even laciniated, the segments, however, always obtuse. The *texture* is between fleshy and membranaceous, inclining to the former, generally of a darkish green colour, paler at the margins. The *cellules* are distinct, oblong, and furnished with a pore in the centre; there is no midrib, and the fibrous radicles spring from various parts of the under surface of the fronds; the *male* and *female* fructification generally abundant on the same individual. The *anthers* are exactly sphærical, shortly pedicellated, of a yellowish orange colour, included in cup-shaped receptacles on the upper surface of the fronds, and these receptacles are deeply and sharply laciniated. The *female fructification*, of which there are several on each frond, make their first appearance in the form of conical tubercles of the same colour and texture as the frond itself; and, indeed, formed of the epidermis. In a short time, these, which we have called the *perianths*, reach to the height of about two lines, become cylindrical, opening at the mouth with a truncated, rather jagged orifice; whence proceeds a linear-subulate, slightly curved *capsule*, which, reaching to the height of about two inches, and elevated upon a succulent fruitstalk scarcely longer than the perianth, bursts, from the extremity, into two narrow linear valves which are partially twisted round each other. The opening of the capsule presents a central *filament* or *columella*, equal in length to the *capsule*, and covered with numerous roundish, opaque, brown *seeds*, each of which is marked by lines, indicating its being composed of three or four smaller bodies;—these are attached by means of short simple or forked, rather flat, brownish, semipellucid stalks, which have no appearances of a double spiral helix, as figured by Schmidel.

Besides the two organs of fructification described above, we find imbedded in the surface of the frond, oval or elliptical, compactly granulated, dark green *bodies*, similar to what have been observed in *Jungermannia Blasia*.

We have been surprised to find an increased difficulty, as our investigations proceeded, in discriminating between the *A. punctatus* and *A. lævis*, two species which have been adopted by all pre-

ceding authors. We have characterized the more common appearance of the plant, the extremes of whose varieties have been described as two species by other Botanists;—that with the least divided margin, and the largest in size, is *A. major* of Smith, and the smaller and more deeply divided one, *A. punctatus*, Smith. All, however, remark that the fructification is precisely similar, and what is very remarkable, both Smith and Weber assert that the two plants are frequently found growing intermixed. We fear, too, that the *A. multifidus* of Dickson, cannot be considered as belonging to this genus. Dillenius does not figure the fructification; nor does Mr. Dickson, who is the authority for its being considered of British origin, take any notice of it: Smith has wholly omitted it in the English Botany, and whether we consider the descriptions of Dickson and Dillenius, or the figure of the latter, we have little hesitation in supposing that plant to be the *Jungermannia multifida*.

IV. TARGIONIA.

Common receptacle of the *Fruit* none; *Perianth* globose, terminal, arising from the underside of the frond, two-valved; *Capsule* globose, included, opening irregularly, and filled with *seeds* and *spiral filaments*.

1. *T. hypophylla.*

Targionia hypophylla. *Linn. Sp. Pl. p.* 1603. *Engl. Bot. t.* 287. *Schwaegr. Prodr. Hepat. t.* 35. *Weber, Prodr. Hepat. p.* 108.—*Dill. Musc. t.* 78. *f.* 9. *Hook. Fl. Scot. P. II. p.* 119.

Hab. Banks in rather moist, but exposed situations.—England and Scotland; rare.

Fronds forming large patches, imbricated, oblongo-obovate, plane, between coriaceous and fleshy, the margins entire, of a very deep green colour, dark purplish at the margin, not obviously reticulated, but furnished with numerous oval pores on the upper surface, underneath only is there the appearance of a midrib, which is prominent and covered with numerous fibrous radicles, on each side of which are many purple, transversely oblong, membranous scales, as in *Marchantia*.

Immediately beneath the extremity, or the under side of the frond, is a solitary *Perianth* or *Calyx*, globose, of a deep

purplish black colour, and a texture between membranaceous and coriaceous, and marked with a vertical prominent line, from which it becomes dehiscent and consequently two-valved. Within this perianth are seen, in an early stage, a few pistilliform bodies, one of which becomes a sphærical *germen*, covered with a *calyptra*, which is tipped by a rather long *style*; the *calyptra* bursts irregularly and vertically. The spherical *capsule* is protruded beyond it, but never reaches further than the Perianth. *Fruitstalk* accordingly very short and succulent. *Capsule* dark brown, opening at the extremity with several unequal segments and discharging innumerable brown *seeds*, mixed with short *spiral filaments*, composed of a double helix.

V. MARCHANTIA.

Common receptacle of the fruit pedunculated, peltate, bearing beneath shortly pedicellated pendent *capsules*, opening at the extremity with about eight teeth, and filled with seeds and *spiral filaments*. *Anthers?* oblong, imbedded in a flat carnose sessile or pedunculated papillary disk.—*Gemmæ*, abundant in this genus on the frond, lenticular, contained in variously shaped receptacles, and germinating even while on the parent frond.

1. *M. polymorpha*; receptacle of the capsules deeply cut in a stellated manner into about 10 narrow segments, that of the anthers pedunculated.

Marchantia polymorpha. *Linn. Sp. Pl. p.* 160. *Schmid. Ic. t.* 9. *(male) a. t.* 29. *(fem.) Engl. Bot. t.* 110. *Hook. Fl. Scot. P. II. p.* 119. *Raddi, in Opusc. Scient. di Bologna, v.* 2.—*Dill. Musc. t.* 76. *f.* 6.

HAB. In moist and wet situations; also in dry spots, when shaded; very common.

Fronds much imbricated, procumbent, erect only when growing in water, extremely variable in length, rarely simple, generally once or twice divided in a dichotomous manner; from one to four or even five inches long; the laciniæ mostly short, rounded, and nearly entire; sometimes, as when growing in water, very much elongated, linear-oblong, marked on the upper surface with a depressed dark line, which on the under

side constitutes a prominent blackish midrib, whence, for nearly the whole length of the plant, spring numerous pale, silky, fibrous radicles. The *colour* is generally a uniform dull green; the *texture* between fleshy and membranaceous, more approaching to the latter, strikingly cellular, the cells oblong, furnished in the centre with a small pore, arranged in parallel lines, diverging upward from the midrib at an acute angle. *Fructification* dicœcious; fronds bearing anthers similar to those bearing capsules. *Male receptacle* greenish, the papillæ purple, supported on peduncles springing from the base of a sinus at the extremity of the frond, just beneath the margin; about one inch in length, obtusely quadrangular, thickened upwards. On one side of the peduncle are two grooves, each containing a bundle of filaments that pass through their whole length and diverge on the under side of the peltate receptacle into as many rays as there are lobes to the receptacle. *Receptacle* flat on the summit, horizontal, papillose, fleshy, thin and membranaceous at the margin, and cut into about eight short, rounded lobes. *Anthers* equal in number to the *papillæ* on the surface of the receptacle, and imbedded in its fleshy portion. A vertical section shows them to be of nearly oval form and reticulated structure, filled with soft granular matter; these *anthers* are surrounded by an ovate reticulated membrane, attenuated above and opening by an orifice through the papillæ externally. On the underside of the receptacle are numerous imbricated scales, radiating, so that each ray corresponds with a marginal lobe of the receptacle, and there covers the diverging fibres above mentioned. *Female fructification*;—*receptacle* of the capsules pedunculated; the peduncle from one to three or four inches long, arising as in the male fructification, and similar to it in shape and structure, but not thickened above. The *receptacle* is hemispherical, deeply divided to the base into from eight to ten linear, cylindrical, decurved rays, covering as many involucres which are united at the base, and there intermixed with minute chaffy scales; these involucres are oblong, membranaceous, open at the extremity, and remarkably laciniated, enclosing at the base while young, two or three pendent *pistils*, as in *Jungermannia*, each surrounded by an ovate quadri-

fid, membranaceous perianth. Of these pistils one or more comes to maturity. The *calyptra* is obovate, tipped with a short *style*, and bursts irregularly for the emission of the capsule. The *capsule* is ovate, pale greenish, brown, shortly pedicellated, so as to be protruded a little beyond the calyx, and opens into about eight short and nearly equal segments at the extremity, immediately overflowing with innumerable greenish brown, sphærical *seeds*, intermixed with *spiral filaments* of the same colour, and formed of a double helix. When the capsules are mature, the segments of the receptacle are frequently bent back, so as to become erect from the expansion of the numerous capsules.

Besides these two modes of fructification, we find, on fertile as well as sterile individuals, at all seasons of the year, cup-shaped processes, in various parts of the upper surface of the frond, and always on the midrib; of the same texture as the frond itself, but with more membranaceous, laciniated margins; within which are contained several lentil-shaped membranaceous bodies of a reticulated structure, and frequently furnished with pellucid dots; these are the *gemmæ*, which frequently throw out radicles before leaving those receptacles, and striking root on the spots where they happen to fall, in time become perfect fronds.—We have been thus particular in our description, as the structure of the other species is probably very similar, while this is the most common of them all.

1. *M. conica;* receptacle of the capsule conical ovate somewhat angular nearly entire at the margin, that of the anthers sessile.

Marchantia conica. *Linn. Sp. Pl. p.* 1604. *Schmid. Ic. t.* 31. *(excellent,) Engl. Bot. t.* 504. *Hook. Fl. Scot. P. II. p.* 120.—*Dill. Musc. t.* 75. *f.* 1.

Fegatella officinalis. *Raddi in Opusc. Scient. di Bologna, v.* 2.

Hab. Sides of mill ponds and shady banks, common.

Fronds procumbent, from three to four or five inches long, several times divided in a dichotomous manner, the segments oblong, obtuse, the margins scarcely waved or crenate, colour almost a uniform yellowish green, the *texture* more inclined to fleshy than membranaceous, the reticulation larger and more distinct than in any other species. *Cells* oblong and hexagonal, the central pore very conspicuous and surrounded by a

whitish thickened margin; the *midrib* scarcely distinguishable on the upper surface but by a longitudinal depression; beneath, however, prominent and thickly covered, for its entire length, with the usual fibrous radicles; among these radicles, and almost concealed by them, arise, on each side of the midrib, a few membranaceous, oblique scales, which are more evident upon the young shoots or innovations, where the roots are fewer, and are then of a purple colour; occasionally scales of a similar nature, but greenish colour, overlap the margin of the innovations at the extremity. These scales, when seen in their more perfect state, appear to be unequally two-lobed at their anterior margin. *Fructification*, as far as we have observed, constantly dioecious. *Male receptacle* entirely sessile, arising, we believe, always from the midrib in various parts of its surface; in its form and structure it resembles those of the two preceding species. *Female receptacle* pedunculated; the peduncle differing from that of other *Marchantiæ* in being remarkably succulent, as in *Jungermannia epiphylla*, becoming flat and apparently membranaceous when dry, and having, as far as we can observe, only one groove with one bundle of fibres; this peduncle is inserted in a concave disk, and is from two to four inches long. The *receptacle* is conical, inclining to ovate, obtuse at the summit, the margins are deflexed and cut into about six very short emarginate lobes; the *involucres* green, two-valved; *calyx* quadrifid, and each seeming to contain but one ovate *capsule*, which is partially exserted and cut into several revolute segments. The *seeds* are large, dark olivaceous, the *spiral filaments* double.

2. *M. hemisphærica;* receptacle of the capsules hemisphærical cut at the margin into from four to ten equal lobes, that of the anthers pedunculated.

Marchantia hemisphærica. *Linn. Sp. Pl. p.* 1604. *Schmid. Ic. t.* 34. *Engl. Bot. t.* 503. *and t.* 2545. ? *(under* M. androgyna, *excluding the two lower figures.)*

Marchantia androgyna. *Linn.* ?

Marchantia quadrata. *Scop. Carn. ed.* 2. *p.* 63.

Reboullia hemisphærica. *Raddi in Opusc. Scient. di Bologna.—Dill. Musc. t.* 75. *f.* 2.

HAB. Sides of mountain streams and moist banks, not uncommon, flowering in April.

Fronds procumbent, imbricated, oblong, from one to two and sometimes three inches long, rarely simple, generally forked, waved and crenate at the margin; texture between carnose and membranaceous, inclining to the latter; the colour green above, frequently with a darker central line indicating the midrib, the under side often purple at the margin, the midrib prominent, throwing out numerous silky fibres, and on each side beset with purple scales, partially concealed by the roots, sometimes the centre of the frond below is purple; on the upper surface the cells are very distinctly marked, and, as in *M. polymorpha*, furnished in the centre with a pore.

Fructification monœcious as well as dicecious; *male receptacles* with short pedicells springing from the midrib in a sinus at the extremity of the frond, receptacle peltate, flat and papillose above, purplish, their margins somewhat reflected, cut into four, eight, or nine rounded unequal lobes. *Anthers* as in *M. polymorpha*. *Female receptacle* with pedicells from two to four inches long, hemisphærical, cut at the margin into from four to ten, or eleven obtuse, deflexed lobes, covering as many membranaceous involucres, which are entire at the margins; *calyces* white, membranaceous quadrifid, two or three in each involucre. *Calyptra* as in the preceding. *Capsule* scarcely protruded at maturity, consequently upon a very short fruitstalk, of a dark brown colour, cut for nearly half way down into seven or eight obtuse revolute segments, containing a great number of equally dark brown *seeds*, and *spiral filaments*, as in *M. polymorpha*.

Gemmiferous scyphi, crescent shaped, as in the genus *Lunularia* of Micheli.

Mr. Francis sends us, from Edgefield, Norfolk, specimens with female fructification only, which we find to differ from the common appearance of the plant just described, by the more compactly cellular nature of the frond, so that the areolæ are not visible in a dry state.

A second variety, as we presume it to be, we have received from Mr. Borrer of Sussex, with the fronds more elongated, the margins beautifully crenate, and, like the under side, of a deep purple; the cellules and pores less distinct than even in

the last mentioned variety; upon it we have the pedunculated male receptacles, and lying among the specimens received, but not attached to them, a single female receptacle, in all probability belonging to them and having all the characters of that of *M. hemisphærica.* Still a third appearance of this species, as we presume it to be, is found growing abundantly on a bank, intermixed with *Targionia hypophylla*, in the New Forest, Hants, by Mr. Lyell. In this, likewise, the specimens have the fronds of a compact nature, the under side and margin of a deep purple, the upper surface sometimes, especially in the dry state, apparently as destitute of areolæ as that of the last variety, whilst at other times, when moist particularly, we have observed the areolæ and their pores tolerably conspicuous. The female fructification, as seen and described to us by Mr. Lyell, seems precisely similar to that of *M. hemisphærica*, but the most remarkable peculiarity in this plant, is, that the male receptacles, which are very abundant, have hitherto been observed always sessile, and imbedded, as it were, in the substance of the frond, situated near the extremities, whence, at the period of their decay, innovations of the frond are seen to issue.

The three varieties just alluded to, we believe, are found growing upon comparatively dry banks, and to this may be attributed the compact nature of the frond, the deep purple hue of its under side and margins, and the indistinct appearance of the cellules. The *M. quadrata* of Scopoli, which Sir James Smith refers to his *M. androgyna* in *Engl. Bot.* may, we think, be quoted under *M. hemisphærica.*

We cannot help expressing our suspicions that the *M. androgyna*, at least of English Botany, is nothing more than *M. hemisphærica.* We allude to the two upper figures, the two lower ones with more perfect fructification, are stated to be copied from Swiss specimens, and we have no hesitation in pronouncing them to be the *M. fragrans* of Balbis, a highly curious species, which has never yet been found in Britain; we, however, possess specimens of the same, or an analogous species, which we have received from Philadelphia and the Cape of Good Hope, as well as Switzerland and Savoy, and

they constitute the very remarkable genus which has been described by Nees Von Esenbeck, in the Horæ Berolinenses, under the name of *Fimbriaria*.

The essential character, given by Smith, is, to have "the calyx of the female flowers hemisphærical, with four clefts, and four cells," which is by no means at variance with the common appearance of *M. hemisphærica*. The figures, too, are sufficiently characteristic, and, in the form of the frond, more faithful than in *M. hemisphærica*, tab. 503. The upper left hand plant has the appearance and purple edges of our Edgefield variety.

The name *M. androgyna*,* originated with Linnæus; but his character, as given in the *Sp. Plant.* where it was first noticed, is "M. calyce communi integro hemisphærico," adding "monoica seu androgyna est hæc species;" he states it to be a native of Italy and Jamaica, and refers to Micheli, t. 2. f. 3. (the authority for the Italian plant) and to Dill. Musc. t. 75. f. 3. the authority for the Jamaica plant. Micheli's plant, as far as we can judge from the magnified figure, may possibly be that state of the plant with sessile male receptacles, which we have noticed above, as found by Mr. Lyell; and to which, if to any, the name of *M. androgyna* may still be applied; the female receptacles are equally divided with our *M. hemisphærica*; yet the fronds are much longer, narrower, and repeatedly divided in a dichotomous manner. With regard to Dillenius' plant from Jamaica, the fronds are still more unlike ours, and, as is evident both by his description and figure, are furnished with gemmiferous scyphi, and not with male receptacles. Now it appears that Linnæus' character of *M. androgyna* was taken from a Siberian plant, described by Scopoli and Smith, under the name of *M. triandra*, and hence, Smith observes, our great naturalist erred in making its specific character "Calyx communis integer." To return again to the figures in English Botany, there is no male fructification de-

* We have seen in Ireland that the same peduncle has sometimes on its summit the peltate disk, with one half of its summit having *capsules* pointing downwards, the other half with its upper surface having *anthers* imbedded. Can this have given origin to the name, *M. androgyna*?

scribed, nor, so far as we can discover, any mark by which to distinguish it from *M. hemisphærica.*

Schmidel, under *M. hemisphærica*, t. 34. at f. 3. and XIII. has figured, and has described what appear to be sessile male receptacles, on the same fronds with the pedunculated ones; and this would seem to strengthen our opinion of the two kinds being found on the same species.

VI. JUNGERMANNIA.*

Common receptacle of the fruit none. *Perianth* or Calyx monophyllous, tubular, (rarely wanting.) *Capsule* 4-valved, terminating a *peduncle* which is longer than the perianth.

A. FOLIACEOUS.

† DESTITUTE OF STIPULES.†

a. Leaves inserted on all sides.

1. *J. trichophylla;* stem creeping irregularly branched, leaves imbricated on all sides here and there fasciculated setaceous jointed patent straight, fruit terminal, calyces oblong, the mouth contracted ciliated.

   Hook. Brit. Jung. t. 7. *Engl. Bot. t.* 2252.

   HAB. Moist ground.

2. *J. setacea;* stem creeping somewhat pinnatedly branched, leaves imbricated on all sides, two together, setaceous jointed patent incurved, fruit terminal upon short proper branches, calyces oblong, mouth open ciliated.

   Hook. Brit. Jung. t. 1. *Engl. Bot. t.* 2482.

   HAB. On the ground and decaying stumps of trees.

3. *J. julacea;* stem nearly erect irregularly branched filiform, leaves quadrifarious ovate closely imbricated erect acutely

* Of *Jungermannia* we have only given the essential character of the genus, and a synopsis of the species, referring for more ample accounts, both of the one and the other, to the "*Monograph of the British Jungermanniæ.*"

† We have brought here, *J. Sphagni* and *J. compressa*, which have stipules only upon their young shoots.

bifid, the segments lanceolate acuminate subserrate, those of the perichætium quadripartite, fruit terminal, calyces oblong plicated upwards, the mouth open toothed.

Hook. Brit. Jung. t. 2. *Engl. Bot. t.* 1024.

HAB. On elevated mountains in wet soil.

4. *J. laxifolia;* stem erect nearly simple filiform, leaves remote quadrifarious erecto-patent ovate subcarinate acutely bifid (those of the perichætium similar,) fruit terminal, calyces oblong subplicate, the mouth contracted toothed.

Hook. Brit. Jung. t. 59.

HAB. Mountain rivulets, Ireland.

5. *J. juniperina;* stem erect flexuose nearly simple, leaves quadrifarious falcato-secund linear-lanceolate bipartite, segments straight acuminate, fruit terminal, calyces ovate bearing leaves.

Hook. Brit. Jung. t. 4. *Engl. Bot. t.* 2443.

HAB. On rocks in subalpine countries.

6. *J. Hookeri;* stem erect somewhat branched, leaves imbricated on all sides ovate or oblongo-ovate here and there lobed or angled, fruit terminal, calyx none, calyptra large oblong fleshy smooth.

Engl. Bot. t. 2555. *Hook. Brit. Jung. t.* 54.

HAB. Very rare. Boggy places at Cadnam, New Forest, Hants; and Kinnordy Moss, Forfarshire.—*C. Lyell, Esq.*

b. Leaves bifarious.

* *Leaves undivided.*

7. *J. asplenioides;* stem ascending branched, leaves obovato-rotundate ciliato-dentate somewhat recurved, fruit terminal and lateral, calyces oblong compressed oblique, the mouth truncated subciliated.

Hook. Brit. Jung. t. 13. *Engl. Bot. t.* 1788.

HAB. Woods and among rocks, common

8. *J. spinulosa;* stem erect branched, leaves obovate recurved with the margin and the apex on one side dentato-spinulose, fruit lateral and axillary, calyces roundish compressed, the mouth truncate ciliated.

21. *J. orcadensis;* stem erect nearly simple, leaves closely imbricated erect or patent cordato-ovate the margins recurved.

Jungermannia orcadensis. *Hook. Brit. Jung. t.* 71.

HAB. Mountains. Orkney, Angusshire and Cumberland. South of Ireland.

22. *J. inflata;* stem erect simple or branched, leaves roundish concave acutely bifid, segments straight obtuse, fruit terminal, calyces pyriform, the mouth contracted toothed.

Jungermannia inflata. *Hook. Brit. Jung. t.* 38. *Engl. Bot. t.* 2512.

HAB. Moist heaths.

23. *J. excisa;* stem prostrate nearly simple, leaves patent subquadrate deeply notched, fruit terminal, calyces oblong, the mouth plicated toothed.

Jungermannia excisa. *Hook. Brit. Jung. t.* 9. *Engl. Bot. t.* 2497.

HAB. Wet heaths and shady woods on the ground.

24. *J. ventricosa;* stem prostrate somewhat branched, leaves patent subquadrate bluntly emarginate, the sides incurved, fruit terminal, calyces oblong, the mouth contracted plicated toothed.

Jungermannia ventricosa. *Hook. Brit. Jung. t.* 28. *Engl. Bot. t.* 2568.

HAB. Shady woods and banks.

25. *J. Turneri;* stem procumbent flexuose branched in a stellated manner, leaves broadly ovate acutely bipartite, segments subconduplicate spinuloso-dentate, the fruit terminal, calyces linear-oblong longitudinally plicated.

Jungermannia Turneri. *Hook. Brit. Jung. t.* 29. *Engl. Bot. t.* 2510.

HAB. Shady bank of a mountain rivulet near Bantry, Ireland.

26. *J. bicuspidata;* stem procumbent branched in a stellated manner, leaves subquadrate acutely bifid, the segments acute straight entire, fruit terminal, calyces oblong plicate, the mouth toothed.

Jungermannia bicuspidata. *Hook. Brit. Jung. t.* 11. *Engl. Bot. t.* 2239.

HAB. Hedge banks and moist heaths, common.

27. *J. byssacea;* stem procumbent branched in a stellated man-

ner, leaves subquadrate obtusely bifid, the segments acute, fruit terminal, calyces oblong plicate, the mouth toothed.

Jungermannia byssacea. *Hook. Brit. Jung. t.* 12. *Engl. Bot. t.* 719. *(J. divaricata.)*

HAB. Heathy places, in dry and exposed situations.

28. *J. connivens;* stem procumbent branched in a stellated manner, leaves orbicular concave with a lunulate notch at the extremity, fruit terminal upon proper short central branches, calyces oblongo-ovate, the mouth ciliated.

Jungermannia connivens. *Hook. Brit. Jung. t.* 15. *Engl. Bot. t.* 2436.

HAB. Wet bogs.

29. *J. curvifolia;* stem procumbent branched in a stellated manner, leaves roundish very concave bifid, the segments acute incurved, fruit terminal upon short proper central branches, calyces oblong subplicate, the mouth dentate.

Jungermannia curvifolia. *Hook. Brit. Jung. t.* 16. *Engl. Bot. t.* 1304.

HAB. Alpine situations, especially on decaying wood.

* * * *Leaves tri-quadrifid; the segments equal.*

30. *J. capitata;* stem prostrate nearly simple, leaves rotundato-quadrate, the lower ones bifid, the rest tri-quadrifid, fruit terminal, calyces oblongo-ovate subplicate, the mouth contracted toothed.

Jungermannia capitata. *Hook. Brit. Jung. t.* 80.

HAB. Bogs, South of England and of Ireland.

31. *J. incisa;* stem prostrate nearly simple, leaves rotundato-quadrate waved subtrifid, the segments unequal here and there denticulate, fruit terminal, calyces obovate.

Jungermannia incisa. *Hook. Brit. Jung. t.* 10. *Engl. Bot. t.* 2528.

HAB. Wet bogs.

32. *J. pusilla;* stem procumbent nearly simple, leaves horizontal quadrate waved obtusely bi-tricrenate, fruit terminal, calyces campanulate.

Jungermannia pusilla. *Hook. Brit. Jung. t.* 69. *Engl. Bot. t.* 1775.

HAB. Moist shady banks, especially on clay.

33. *J. setiformis;* stem erect nearly simple, leaves bifarious closely imbricated erect quadrate quadrifid having the in-

ferior angles sometimes spinuloso-dentate at the margins, fruit lateral and terminal, calyces oblong plicate, the mouth open.

Jungermannia setiformis. *Hook. Brit. Jung. t.* 20.

HAB. Rocks on the high mountains of Scotland.

* * * * *Leaves bifid, the segments unequal conduplicate.*

34. *J. nemorosa;* stem erect subdichotomous, leaves unequally two-lobed semibifid dentato-ciliate, lobes conduplicate the *lower* ones larger obovate, the *upper* ones subcordate obtuse, fruit terminal, calyces oblong incurved compressed, the mouth truncate dentato-ciliate.

Jungermannia nemorosa. *Hook. Brit. Jung. t.* 21. *Engl. Bot. t.* 607. *and* 2437.

HAB. In woods and among rocks, especially in subalpine situations.

35. *J. planifolia;* stem erect nearly simple, leaves unequally two-lobed bipartite to the base dentato-ciliate, lobes conduplicate the lower ones larger ovate, the upper ones cordate obtuse.

Jungermannia planifolia. *Hook. Brit. Jung. t.* 77.

HAB. Highland mountains, and those of the South of Ireland; on rocks, rare.

36. *J. umbrosa;* stem nearly erect somewhat branched, leaves unequally lobed the lobes conduplicate their apices serrated acute, the lower ones larger ovate, the upper ones roundish ovate, fruit terminal, calyces oblong incurved compressed, the mouth truncated entire.

Jungermannia umbrosa. *Hook. Brit. Jung. t.* 24. *Engl. Bot. t.* 2527.

HAB. Wet mountainous situations.

37. *J. undulata;* stem erect subdichotomous, leaves unequally lobed waved entire, the lobes roundish conduplicate, the lower ones larger, fruit terminal, calyces oblong incurved compressed, the mouth truncate entire.

Jungermannia undulata. *Hook. Brit. Jung. t.* 22. *Engl. Bot. t.* 1023. *(J. purpurea.) and t.* 2251.

HAB. Wet alpine situations, abundant.

38. *J. resupinata;* stem procumbent nearly simple, leaves round-

ish nearly equally two-lobed entire, the lobes conduplicate, fruit terminal, calyces oblong incurved compressed, the mouth truncated denticulate.

Jungermannia resupinata. *Hook. Brit. Jung. t.* 23. *Engl. Bot. t.* 2498.

HAB. Banks in woods.

39. *J. albicans;* stem erect slightly divided, leaves unequally two-lobed lobes conduplicate pellucid in the middle serrated at the point, the lower ones larger subacinaciform, the upper ones oblongo-ovate acute, fruit terminal, calyces obovate cylindrical, the mouth contracted toothed.

Jungermannia albicans. *Hook. Brit. Jung. t.* 25. *Engl. Bot. t.* 2240.

HAB. Moist banks, abundant.

40. *J. obtusifolia;* stem ascending simple, leaves unequally two-lobed, lobes conduplicate obtuse entire, the lower ones larger subacinaciform, the upper ones ovate, fruit terminal, calyces obovate, the mouth contracted toothed.

Jungermannia obtusifolia. *Hook. Brit. Jung. t.* 26. *Engl. Bot. t.* 2511.

HAB. Ireland and North of England, rare.

41. *J. Dicksoni;* stem ascending nearly simple, leaves unequally lobed lobes conduplicate, the lower ones larger, both narrow ovate nearly entire acute, fruit terminal, calyces ovate plicate, the mouth contracted toothed.

Jungermannia Dicksoni. *Hook. Brit. Jung. t.* 48. *Engl. Bot. t.* 2591.

HAB. Scotland and about Dublin, rare.

42. *J. minuta;* stem erect nearly dichotomous, leaves horizontally patent subconduplicate, the superior ones equally the inferior ones unequally two-lobed, all rather acute, fruit terminal, calyces obovate a little plaited at the extremity, the mouth contracted denticulate.

Jungermannia minuta. *Hook. Brit. Jung. t.* 44. *Engl. Bot. t.* 2231.

HAB. Rocks in alpine situations.

43. *J. exsecta;* stem prostrate nearly simple, leaves unequally two-lobed, the lobes conduplicate, the inferior ones larger ovate acute concave, the apex often two-toothed, the upper ones minute dentiform.

Jungermannia exsecta. *Hook. Brit. Jung. t.* 19.

HAB. Dry heaths.

44. *J. cochleariformis;* stem procumbent nearly simple, leaves imbricated above unequally two-lobed conduplicate, upper lobes larger convex, the apex bifid and serrated, the lower ones serrate.

Jungermannia cochleariformis. *Hook. Brit. Jung. t.* 68. *Engl. Bot. t.* 2500.

HAB. Alpine bogs.

45. *J. complanata;* stem creeping vaguely branched, leaves distichous imbricated above unequally two-lobed, superior lobes larger orbicular, inferior ones ovate appressed plane, fruit terminal, calyces oblong compressed truncate.

Jungermannia complanata. *Hook. Brit. Jung. t.* 81. *Engl. Bot. t.* 2499.

HAB. Trunks of trees, abundant.

†† STIPULATE.

a. Leaves entire or rarely now and then emarginate.

46. *J. anomala;* stem procumbent simple, leaves orbicular, roundish ovate and ovato-acuminate, stipules broadly subulate.

Jungermannia anomala. *Hook. Brit. Jung. t.* 24. *Engl. Bot. t.* 2518.

HAB. Bogs, not unfrequent.

47. *J. Taylori;* stem erect nearly simple, leaves all of them roundish, stipules broadly subulate, fruit terminal, calyces ovate compressed at the mouth truncated and two-lipped.

Jungermannia Taylori. *Hook. Brit. Jung. t.* 56.

HAB. Alpine bogs.

48. *J. scalaris;* stem creeping simple, leaves roundish concave entire emarginate, stipules broadly subulate, fruit terminal, calyx immersed in the leaves.

Jungermannia scalaris. *Hook. Brit. Jung. t.* 61. *Engl. Bot. t.* 605. *(J. lanceolata.)*

HAB. Hedge banks, and barren wastes, very frequent.

49. *J. polyanthos;* stem procumbent somewhat branched, leaves horizontal roundish quadrate plane entire and emarginate, stipules oblong bifid, fruit on proper branches from the lower part of the stem and lateral, calyces half the length of the calyptra two-lipped laciniated.

Jungermannia polyanthos. *Hook. Brit. Jung. t.* 62. *Engl. Bot. t.* 2475.

HAB. Moist and very wet places, not uncommon.

50. *J. cuneifolia;* stem creeping simple, leaves rather remote cuneiform entire or very obtusely notched at the extremity, stipules minute ovate bifid.

Jungermannia cuneifolia. *Hook. Brit. Jung. t.* 64.

HAB. Parasitic on *J. Tamarisci*, near Bantry, Ireland.

51. *J. viticulosa;* stem procumbent branched, leaves horizontal plane ovate entire, stipules broadly ovate dentato-laciniate, fruit lateral, calyces subterraneous oblong fleshy, mouth fimbriated with foliaceous scales.

Jungermannia viticulosa. *Hook. Brit. Jung. t.* 60. *Engl. Bot. t.* 2513.

HAB. Rocks and among mosses, in alpine countries.

52. *J. Trichomanis;* stem creeping nearly simple, leaves horizontal convex ovate entire and emarginate, stipules roundish lunularly emarginate, fruit lateral, calyces subterraneous oblong fleshy hairy, mouth crenated.

Jungermannia Trichomanis. *Hook. Brit. Jung. t.* 79. *Engl. Bot. t.* 1875.

HAB. Moist ground, frequent.

53. *J. bidentata;* stem procumbent branched, leaves broadly ovate decurrent bifid at the apex, segments very acute entire, stipules bi-trifid and lacinated, fruit terminal, calyces oblong subtriangular, the mouth laciniated.

Jungermannia bidentata. *Hook. Brit. Jung. t.* 30. *Engl. Bot. t.* 281. *(J. bicuspidata.) and t.* 606.

HAB. Moist hedge banks, and near the roots of trees, abundant.

54. *J. heterophylla;* stem creeping branched, leaves roundish ovate decurrent, apex rarely acute generally obtusely emarginate or entire, stipules bi-trifid here and there sublaciniated, fruit terminal, calyces ovate obtusely triangular, mouth laciniated.

Jungermannia heterophylla. *Hook. Brit. Jung. t.* 31.

HAB. Decaying stumps of trees.

55. *J. stipulacea;* stem procumbent simple, leaves rounded

acutely emarginate at the apex, the segments acute straight, stipules large ovate acuminate at the margin near the base on each side unidentate, fruit lateral, calyces obovate subplicate at the apex, mouth contracted, obtusely toothed.

Jungermannia stipulacea. *Hook. Brit. Jung. t.* 41. *Engl. Bot. t.* 2536.

HAB. Shady rocks, Scotland and Ireland, rare.

56. *J. Francisci;* stem nearly erect, simple or branched, leaves ovate concave acutely emarginated, stipules minute ovate bifid, fruit terminal upon proper branches, calyces oblongo-cylindrical, a little plaited, the mouth toothed.

Jungermannia Francisci. *Hook. Brit. Jung. t.* 49. *Engl. Bot. t.* 2565.

HAB. Moist banks, England and Ireland, rare.

57. *J. barbata;* stem procumbent nearly simple, leaves rotunda-to-quadrate tri-quadrifid, stipules lanceolate acutely bifid laciniated at the margin, fruit terminal, calyces ovate, the mouth contracted toothed.

Jungermannia barbata. *Hook. Brit. Jung. t.* 70. *Engl. Bot. t.* 2517. *(J. quinquedentata.)*

HAB. Rocks, woods, and heathy spots, abundant, especially in subalpine countries.

58. *J. albescens;* stem creeping branched, leaves very concave almost hemisphærical emarginate, stipules ovato-lanceolate obtuse, fruit terminal on short branches, calyces oblongo-ovate, the mouth toothed.

Jungermannia albescens. *Hook. Brit. Jung. t.* 88. *and Suppl. t.* 4.

HAB. Summits of the highest mountains in Scotland, rare.

59. *J. reptans;* stem creeping stellatedly branched, leaves imbricated on the upper side subquadrate incurved acutely quadridentate, stipules broadly quadrate quadridentate, fruit radical, calyces oblong plicate, the mouth toothed.

Jungermannia reptans. *Hook. Brit. Jung. t.* 75. *Engl. Bot. t.* 608.

HAB. Woods and shady places, frequent.

60. *J. trilobata;* stem creeping flexuose branched, leaves imbricated on the upper side ovate convex obtusely tridentate, stipules broadly subquadrate crenate, fruit arising from the lower part of the stem, calyces oblong subacuminate, the mouth cleft on one side.

Jungermannia trilobata. *Hook. Brit. Jung. t.* 76. *Engl. Bot. t.* 2232. *(J. radicans.)*

HAB. Alpine moist situations, frequent.

c. Leaves bifid, the segments unequal conduplicate.

* *Lower or smaller segments plane.*

61. *J. platyphylla;* stem procumbent pinnatedly branched, leaves unequally two-lobed, the superior lobes roundish ovate nearly entire, the inferior ones and stipules ligulate entire, fruit lateral, calyces ovate compressed the mouth truncated inciso-serrated cleft on one side.

Jungermannia platyphylla. *Hook. Brit. Jung. t.* 40. *and Suppl. t.* 3. *Engl. Bot. t.* 789.

HAB. Walls, rocks, and trunks of trees, abundant.

62. *J. lævigata;* stem procumbent vaguely bipinnate, leaves unequally two-lobed spinuloso-dentate, superior lobes roundish ovate, lower ones ligulate, the stipules oblongo-quadrate spinuloso-dentate.

Jungermannia lævigata. *Hook. Brit. Jung. t.* 35.

HAB. Rocks in alpine countries.

63. *J. ciliaris;* stem procumbent pinnatedly branched, leaves very convex unequally two-lobed, the lobes and lobules ovate bipartite with long slender ciliæ, stipules subquadrate, the apex 4—5 lobed with long ciliæ, fruit lateral, calyces obovate, the mouth contracted toothed.

Jungermannia ciliaris. *Hook. Brit. Jung. t.* 65. *Engl. Bot. t.* 2241.

HAB. Heaths and rocky spots, common.

64. *J. Woodsii;* stem procumbent bi-tripinnate, leaves very convex unequally two-lobed, the superior lobes bipartite spinuloso-dentate, the lower ones very minute oblong nearly entire, stipules large ovate bipartite spinuloso-dentate with the base spurred on each side.

Jungermannia Woodsii. *Hook. Brit. Jung. t.* 66.

HAB. Mountains in the S. W. of Ireland.

65. *J. tomentella;* stem nearly erect bipinnate, leaves nearly plane unequally two-lobed capillari-multifid, superior lobes

bipartite, the lower ones minute, stipules subquadrate laciniated, fruit axillary, calyces oblong cylindrical hairy, the mouth open.

Jungermannia tomentella. *Hook. Brit. Jung. t.* 36. *Engl. Bot. t.* 2242.

HAB. Wet rocks, especially near cascades.

* * *Lower or smaller segments involute.*

66. *J. Mackaii;* stem creeping irregularly branched, leaves unequally two-lobed, superior lobes rounded, inferior onés minute involute, stipules large roundish obcordate, fruit lateral and terminal, calyces obcordate depressed triangular, the mouth contracted elevated toothed.

Jungermannia Mackaii. *Hook. Brit. Jung. t.* 53. *Engl. Bot. t.* 2573.

HAB. Trunks of trees and rocks, especially on calcareous soil, South of England and Ireland.

67. *J. serpyllifolia;* stem creeping irregularly pinnated, leaves unequally two-lobed, superior lobes rounded, inferior minute involute, stipules rounded acutely bifid, fruit lateral, calyces broadly obovate pentagonal, the mouth contracted elevated somewhat toothed.

Jungermannia serpyllifolia. *Hook. Brit. Jung. t.* 42. *Engl. Bot. t.* 2537.

HAB. Trunks of trees in alpine districts.

68. *J. hamatifolia;* stem creeping irregularly branched, leaves unequally two-lobed, the superior lobes ovate acuminate often curved at the apex, the inferior ones involute, stipules ovate acutely bifid, fruit lateral, calyces obovate pentagonal, the mouth contracted elevated toothed.

Jungermannia hamatifolia. *Hook. Brit. Jung. t.* 51. *Engl. Bot. t.* 2592.

HAB. Trunks of trees, South and West of England, and South of Ireland.

69. *J. minutissima;* stem creeping irregularly branched, leaves unequally two-lobed, superior lobes hemisphærical, inferior ones minute almost obsolete, stipules ovato-rotundate bifid, fruit lateral, calyces obovato-rotundate pentagonal, the mouth contracted slightly toothed.

Jungermannia minutissima. *Hook. Brit. Jung. t.* 52. ' *Engl. Bot. t.* 1633.

HAB. Trunks of trees, especially Holly and Ash, South and West of England, and South of Ireland.

70. *J. calyptrifolia;* stem creeping branched, leaves unequally two-lobed, the superior lobes larger calyptriform, the inferior ones obtusely quadrate circumvolute, fruit lateral, calyces oblong depressed at the apex plane quinquedentate, the mouth minute contracted.

Jungermannia calyptrifolia. *Hook. Brit. Jung. t.* 43. *Engl. Bot. t.* 2538.

HAB. Trunks of trees, rare, South of Ireland and in Cumberland.

* * * *Lower or smaller segments saccate.*

71. *J. Hutchinsiæ;* stem creeping branched, leaves unequally two-lobed, superior lobes ovate spinuloso-serrate, the lower ones minute saccate at the base frequently unidentate, stipules roundish ovate subserrate acutely bifid, fruit lateral, calyces obcordate triangular.

Jungermannia Hutchinsiæ. *Hook. Brit. Jung. t.* 1. *Engl. Bot. t.* 2480.

HAB. Caverns, and by water-falls, South of Ireland, very rare.

72. *J. dilatata;* stem creeping irregularly branched, leaves unequally two-lobed, superior lobes roundish saccate, stipules roundish plane emarginate, fruit terminal, calyces obcordate tuberculated triangular.

Jungermannia dilatata. *Hook. Brit. Jung. t.* 5. *Engl. Bot. t.* 1086. *(J. tamariscifolia.)*

HAB. Trunks of trees, very frequent.

73. *J. Tamarisci;* stem creeping pinnatedly branched, leaves unequally two-lobed, superior lobes ovato-rotundate, inferior ones minute obovate saccate, stipules subquadrate emarginate the margins revolute, fruit on short terminal branches, calyces obovate smooth triangular.

Jungermannia Tamarisci. *Hook. Brit. Jung. t.* 6. *Engl. Bot. t.* 2480.

HAB. On the ground, and creeping over low bushes, especially in subalpine countries, common.

B. FRONDOSE.

a. Without a nerve.

74. *J. pinguis;* frond oblong decumbent nerveless fleshy plane above beneath tumid irregularly branched, the margin sinuate, fruit from the lower part near the margin, calyces very short, the mouth dilated fimbriated, calyptra exserted oblongo-cylindrical smooth.

Jungermannia pinguis. *Hook. Brit. Jung. t.* 46. *Engl. Bot. t.* 185.

HAB. Bogs and watery places.

75. *J. multifida;* frond linear nerveless fleshy compressed pinnatifidly branched, fruit marginal, calyces very short, the mouth dilated fimbriated, calyptra exserted oblongo-cylindrical tuberculated.

Jungermannia multifida. *Hook. Brit. Jung. t.* 45. *Engl. Bot. t.* 186. *and t.* 1476. *(J. sinuata.)*

HAB. Wet spots on heaths, sides of ditches and stumps of decayed trees.

b. Fronds furnished with a nerve.

* *Calyx simple.*

76. *J. Blasia;* frond oblong submembranaceous dichotomous costate below having scattered toothed scales, fruit arising from the upper part of the midrib, calyx and calyptra within the frond.

Jungermannia Blasia. *Hook. Brit. Jung. t.* 82, 83, *and* 84.
Blasia pusilla. *Engl. Bot. t.* 1328.

HAB. On the ground, in alpine countries.

77. *J. epiphylla;* frond oblong submembranaceous irregularly divided obscurely costate the margin entire or somewhat lobed and sinuated, fruit from the upper part of the fronds and near the apex, calyces subcylindrical plicate, mouth somewhat dilated inciso-dentate, calyptra exserted smooth.

Jungermannia epiphylla. *Hook. Brit. Jung. t.* 47. *Engl. Bot. t.* 771.

HAB. Moist ground, frequent.

78. ***J. furcata;*** frond linear dichotomous membranaceous costate glabrous above, beneath and on the margin more or less hairy, fruit from the underside of the midrib, calyces two-lobed conduplicate, the margin ciliated, calyptra ovate hispid.

Jungermannia furcata. *Hook. Brit. Jung. t.* 55, 56. *Engl. Bot. t.* 1632. *and t.* 2514. *(J. fruticulosa.)*

HAB. Trunks of trees, plentiful.

79. ***J. pubescens;*** frond linear dichotomous membranaceous costate pubescent on both sides.

Jungermannia pubescens. *Hook. Brit. Jung. t.* 73.

HAB. Moist rocks.

* * *Calyx double.*

80. ***J. Lyellii;*** frond oblong somewhat branched thin costate the margin nearly entire, fruit from the upper part of the fronds, calyx double, the exterior very short and the margin laciniato-dentate, interior much exserted cylindrical subplicate, calyptra somewhat longer than the calyx.

Jungermannia Lyellii. *Hook. Brit. Jung. t.* 77.

HAB. Wet bogs, rare.

81. ***J. hibernica;*** frond oblong dichotomous thin costate the margin entire, fruit from the upper part of the fronds, calyx double, exterior very short laciniated, interior much exserted ovato-cylindrical subplicate, calyptra much shorter than the interior calyx.

Jungermannia hibernica. *Hook. Brit. Jung. t.* 88. *and Suppl. t.* 4. *f.* 1—6.

HAB. Wet bogs, Ireland and Scotland, rare.

FINIS.

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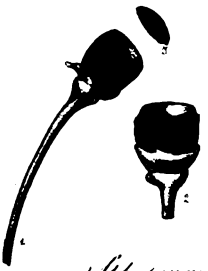
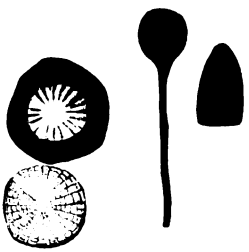
GENERA.

Andraea.

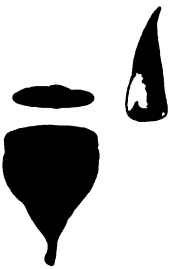


Sphagnum.

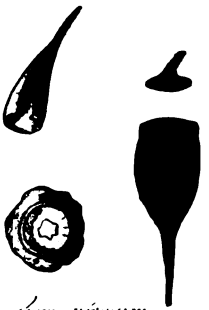
Phascum.



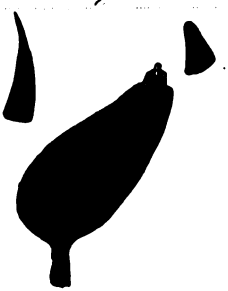
Schistostega.



Archidium.



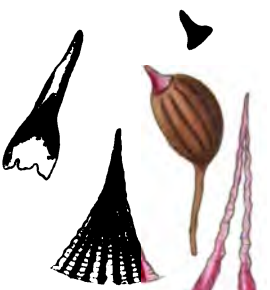
Systegium.



Ephemerum.

Tetraphis.

Splachnum.



Polytrichum.

Buxbaumia.

EXPLANATION OF THE PLATES.

As the greater number of Plates explain themselves, a brief notice of the figures is all that will be required.

TAB. I. GENERA.

(ANDRÆA TO CINCLIDOTUS.)

ANDRÆA. Capsules unopened and expanded, and Calyptra of *A. alpina.**

SPHAGNUM. Capsules with the elongated Receptacle and portion of the Calyptra of *S. obtusifolium.*

PHASCUM. Capsule and Calyptra of *Ph. cuspidatum.*

SCHISTOSTEGA. Capsule and mouth of the Capsule, from Hedwig.—f. 1. Operculum, from our own observations.

ANICTANGIUM. Capsule, Operculum, and Calyptra of *A. ciliatum.*

GYMNOSTOMUM. Capsule, Operculum, and Calyptra of *G. truncatulum.*

DIPHYSCIUM. Capsule, Operculum, and Calyptra of *D. foliosum.*

TETRAPHIS. Capsule, Operculum, and Calyptra of *T. pellucida.*

SPLACHNUM. Capsule, Operculum, and Calyptra of *S. sphæricum.*

CONOSTOMUM. Capsule and Calyptra of *C. boreale.*

POLYTRICHUM. f. 1. Capsule and Calyptra of *P. commune.* f. 2. Capsule and Calyptra of *P. undulatum.* f. 3. Mouth of the Capsule of *P. undulatum.*

CINCLIDOTUS. Capsule, Operculum, Calyptra and teeth of the Peristome of *C. fontinaloides.*

* All the figures in the Tables of Genera are more or less magnified.

TAB. II. GENERA.

(TORTULA TO ORTHOTRICHUM.)

TORTULA. f. 1. Capsule and Calyptra of *T. subulata*. f. 2. Capsule of *T. cuneifolia*. f. 3. Capsule of *T. fallax*. f. 4. Capsule and Operculum of *T. rigida*.

ENCALYPTA. f. 1. Capsule and teeth of the Peristome of *E. ciliata*. f. 2. Calyptra of *E. ciliata*. f. 3. Capsule, Operculum, and teeth of the Peristome of *E. streptocarpa*.

GRIMMIA. f. 1. Capsule, teeth of the Peristome, Operculum and Calyptra of *G. apocarpa*. f. 2. Teeth of the Peristome of *G. Doniana*. f. 3. Teeth of the Peristome of *G. ovata*.

PTEROGONIUM. f. 1. Capsule, Calyptra, and teeth of the Peristome of *P. Smithii*. f. 2. Teeth of the Peristome of *P. gracile*.

WEISSIA. f. 1. Capsule, Calyptra, and teeth of the Peristome of *W. striata*. f. 2. Capsule and portion of the mouth of *W. striata*, with the teeth of the Peristome of *W. trichodes*.

DICRANUM. f. 1. Capsule and Calyptra of *D. cerviculatum*. f. 2. Teeth of the Peristome of *D. cerviculatum*. f. 3. Teeth of the Peristome of *D. scoparium*. f. 4. Teeth of the Peristome of *D. spurium*.

TRICHOSTOMUM. f. 1. Capsule, Operculum, Calyptra and teeth of the Peristome of *T. heterostichum*. f. 2. Teeth of the Peristome of *T. canescens*.

LEUCODON. Capsule, Operculum, Calyptra and teeth of the Peristome of *L. sciuroides*.

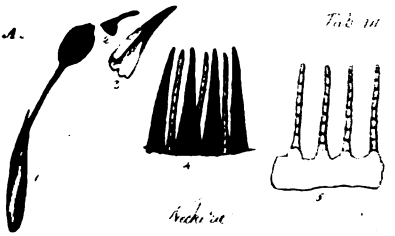
DIDYMODON. f. 1. Capsule, Operculum, Calyptra and teeth of the Peristome of *D. trifarium*. f. 2. Teeth of the Peristome of *D. inclinatum*.

FUNARIA. Capsule, Operculum, Calyptra and teeth of the Peristome of *F. hygrometrica*.

ORTHOTRICHUM. f. 1. Mouth of the Capsule, and teeth of the Peristome of *O. striatum*. f. 2. Mouth of the Capsule, and teeth of the Peristome of *O. affine*. f. 3. Capsule, mouth of the Capsule, Calyptra, and Operculum of *O. anomalum*.

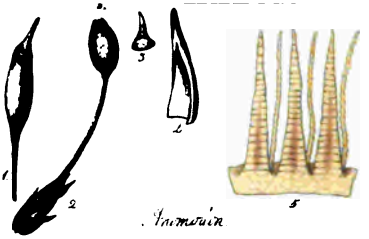
GENERA
Tab II.

Lygodium

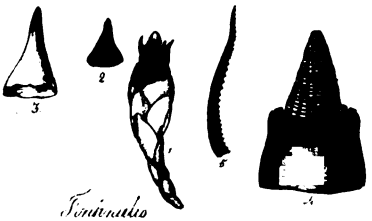


Pachira

Dalbergia

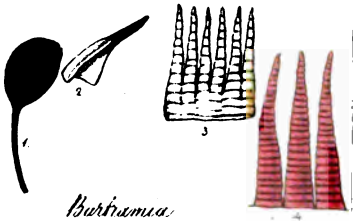


Swartzia

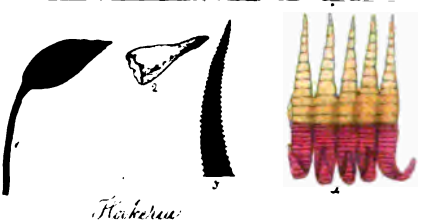


Fontanesia

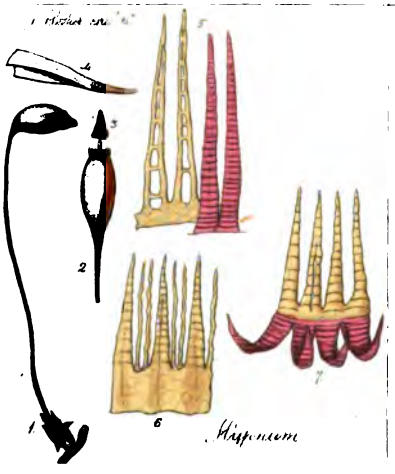
Bauhinia



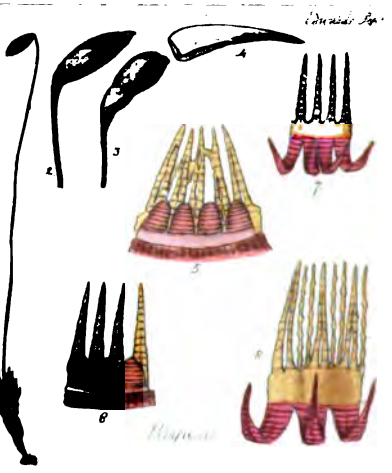
Barkhausia



Harkeria



Hæmatoxylon



Dracæna

TAB. III. GENERA.

(ZYGODON TO BRYUM.)

ZYGODON. f. 1, 2, 3, 4. Capsule, Calyptra, mouth of a Capsule with the teeth closed, and mouth of a Capsule with the teeth expanded, of *Z. conoideum.*

NECKERA. f. 1, 2, 3, 4. Capsule, Operculum, Calyptra, and teeth of the Peristome of *N. crispa.* f. 5. Portion of the inner Peristome of *N. crispa.*

DALTONIA. f. 1, 2, 3, 4. Capsule, Operculum, Calyptra, and teeth of the Peristome of *D. heteromalla.* f. 5, 6. Capsule and Calyptra of *D. splachnoides.*

ANOMODON. f. 1. Capsule of *A. viticulosum.* f. 2, 3, 4, 5. Capsule, Operculum, and Calyptra, and teeth of the Peristome of *A. curtipendulum.*

FONTINALIS. f. 1, 2, 3. Capsule, covered by its Perichætium, Operculum, and Calyptra of *F. antipyretica.* f. 4. Mouth of the Capsule of *F. antipyretica*, deprived of its external teeth, to exhibit the inner Peristome. f. 5. Tooth of the outer Peristome.

BUXBAUMIA. *B. aphylla.* f. 1, 2. Entire plant and Calyptra. f. 3. Upper half of a Capsule. f. 4. Portion of the Peristome.

BARTRAMIA. f. 1, 2. Capsule and Calyptra of *B. pomiformis.* f. 3. Portion of the inner Peristome. f. 4. Portion of the outer Peristome.

HOOKERIA. f. 1, 2. Capsule and Calyptra of *H. lucens.* f. 3. External tooth of the Peristome. f. 4. Portion of the Peristome, with the outer teeth laid open.

HYPNUM. f. 1. Capsule of *H. rutabulum.* f. 2, 3. Capsule and Operculum of *H. dendroides.* f. 4. Calyptra of *H. rutabulum.* f. 5. Portion of the Peristome of *H. dendroides.* f. 6. Inner Peristome of *H. rutabulum.* f. 7. Inner Peristome of *H. complanatum.*

BRYUM. f. 1. Plant of *B. cæspiticium.* f. 2. Capsule of *B. palustre.* f. 3. Capsule of *B. triquetrum.* f. 4. Calyptra of *B. triquetrum.* f. 5. Peristome of *B. elongatum.* f. 6. Peristome of *B. ventricosum.*

TAB. IV. SPECIES.

(SPHAGNUM.)

S. latifolium. Large and small variety, *nat. size.* Leaves and portion of a leaf exhibiting the structure, *magn.*

S. squarrosum. Plant, *nat. size.* Leaf, *magn.*

S. acutifolium. Plant, *nat. size.* Leaf, *magn.*

S. cuspidatum. Plant, *nat. size.* Leaf, *magn.*

TAB. V. SPECIES.

(PHASCUM.)

P. serratum. Plant, *nat. size.* Plant and leaf, *magn.*

P. alternifolium. Plant, *nat. size.* Plant and leaves, *magn.*

P. crispum. Plant, *nat. size.* Plant and leaf, *magn.*

P. subulatum. Plant, *nat. size.* Plant and leaf, *magn.*

P. axillare. Plant, *nat. size.* Plant and leaf, *magn.*

P. patens. Plant, *nat. size.* Plant and leaf, *magn.*

P. bryoides. Plant, *nat. size.* Plant, and leaf, and Capsule, *magn.*

P. curvicollum. Plant, *nat. size.* Plant and leaf, *magn.*

P. rectum. Plant, *nat. size.* Plant, and leaf, and Capsule, *magn.*

P. muticum. Plants of var. *α. nat. size.* Plants, *magn.* Leaf, and point of a leaf, *magn.* Plants of *β. nat. size.* Leaf, and point of a leaf, *magn.*

P. cuspidatum. Plants, *nat. size.* Plants and leaves, *magn.*

TAB. VI. SPECIES.

(ANICTANGIUM AND PART OF GYMNOSTOMUM.)

A. ciliatum. Plant, *nat. size.* Cauline leaf, (f. 1.) Perichætial leaf, (f. 2.) Capsule and Operculum, *magn.*

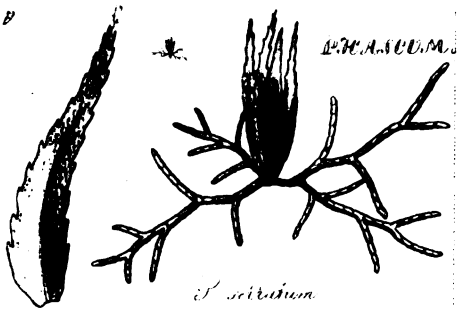
A. imberbe. Plants, *nat. size.* Cauline leaf, (f. 1.) Perichætial leaf, (f. 2.) Capsule and Operculum, *magn.*

GYMNOSTOMUM *lapponicum.* Tuft, *nat. size.* Cauline leaf, (f. 1.) Perichætial leaf, (f. 2.) point of a leaf, Capsule, Operculum, and Calyptra, *magn.*

G. viridissimum. Tuft, *nat. size.* Leaf, point of a leaf, Capsule, and Operculum, *magn.*

S. obtusifolium
S. cuspidatum

Tab D


L. serratum

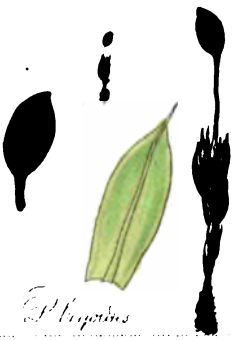
L. ericoides

L. crispum

L. subulatum

L. ciliare

L. juniperinum

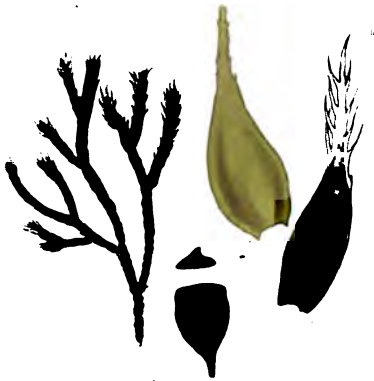

L. virgatum

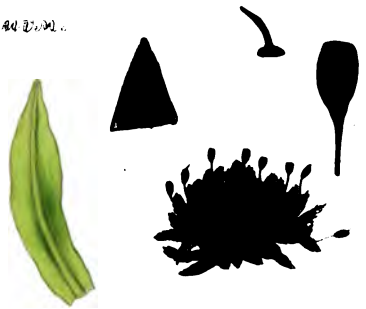
L. canaliculatum

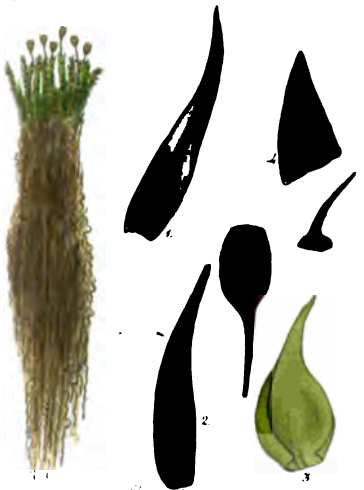
L. scoparium

L. nudum

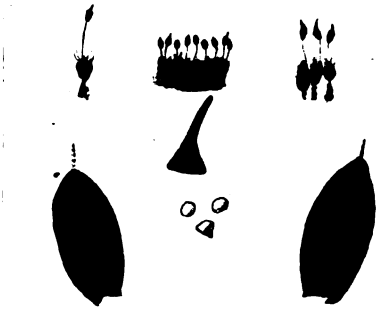
L. angustatum



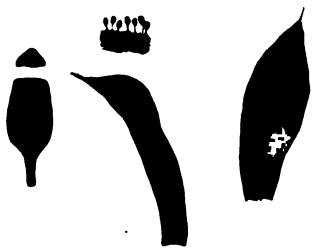




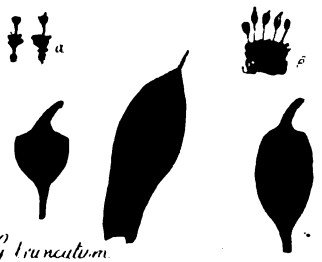
G. Griffithianum



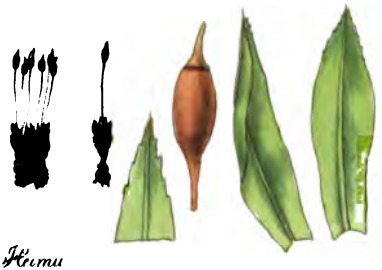
G. ovatum



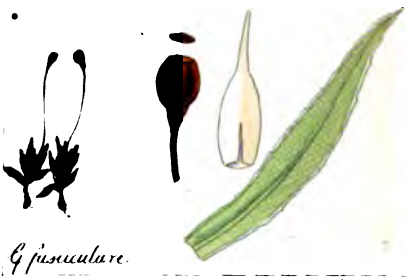
G. conicum



G. truncatulum



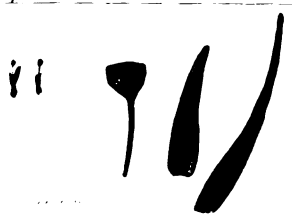
G. Hornu

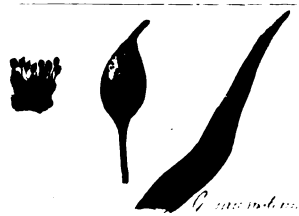


G. fasciculare

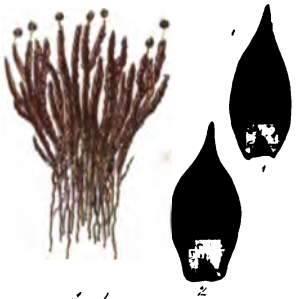
G. pyriforme

G. tenue

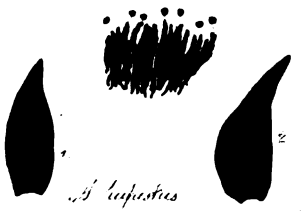




ANDRÆA.



A. alpina



A. rupestris

A. Rothii

A. rupestris

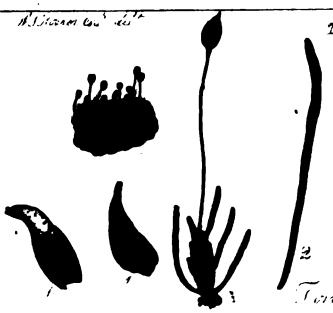
SCHISTOSTEGA.

S. pennata

DIPHYSCIUM.

D. foliosum

TETRAPHIS.



T. Ferula

T. pellucida

G. æstivum. Tuft, *nat. size.* Cauline leaf, (f. 1.) Perichætial leaves, (f. 2, 3.) point of a leaf, Capsule, and Operculum, *magn.*
G. curvirostrum. Tufts, *nat. size.* Leaf and Capsule, *magn.*

TAB. VII. SPECIES.

(GYMNOSTOMUM CONTINUED.)

G. Griffithianum. Plants, *nat. size.* Leaf, Capsule, Operculum, Calyptra, and mouth of the Capsule, *magn.*
G. ovatum. Tuft and single plants, *nat. size.* Leaves and granules, and Operculum, *magn.*
G. conicum. Tuft, *nat. size.* Leaves, Capsule, and Operculum, *magn.*
G. truncatulum. Tufts and plants of *α.* and *β. nat. size.* Leaf and Capsule of *α.* and *β. magn.*
G. Heimii. Tuft and single plant, *nat. size.* Leaves and point of a leaf, and Capsule, *magn.*
G. fasciculare. Plants, *nat. size.* Leaf, Capsule, Operculum, and Calyptra, *magn.*
G. pyriforme. Plants, *nat. size.* Leaf, Capsule and Operculum, *magn.*
G. tenue. Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*
G. Donianum. Plants, *nat. size.* Leaves and Capsule, *magn.*
G. microstomum. Tuft, *nat. size.* Leaf and Capsule, *magn.*

TAB. VIII. SPECIES.

(ANDRÆA TO TETRAPHIS.)

A. alpina. Tuft, *nat. size.* Perichætial leaf, (f. 1.) and Cauline leaf, (f. 2.) *magn.*
A. rupestris. Tuft, *nat. size.* Perichætial leaf, (f. 1.) and Cauline leaf, (f. 2.) *magn.*
A. Rothii. Tuft, *nat. size.* Perichætial leaf, (f. 1.) Cauline leaf, (f. 2.) *magn.*
SCHISTOSTEGA *pennata.* Plants, *nat. size.* Plants and leaves, *magn.*
DIPHYSCIUM *foliosum.* Tuft and single plants, *nat. size.* Plant, *magn.* Cauline leaf, (f. 1.) and Perichætial leaf, *magn.*

TETRAPHIS *ovata*. Tuft, *nat. size*. Plant, *magn*. Perichætial leaves, (f. 1.) and Cauline leaf, (f. 2.) *magn*.

TAB. IX. SPECIES.

(SPLACHNUM.)

S. sphæricum. Plants, *nat. size*. Leaves and Capsules, *magn*.
S. tenue. Plants, *nat. size*. Leaf and Capsules, *magn*.
S. mnioides. Tufts, *nat. size*. Leaves and Capsules, *magn*.
S. ampullaceum. Plants, *nat. size*. Leaf and Capsule, *magn*.
S. angustatum. Tuft, *nat. size*. Leaf and Capsule, *magn*.
S. Froelichianum. Tuft, *nat. size*. Leaf, Capsule, and teeth of the Peristome, *magn*.

TAB. X. SPECIES.

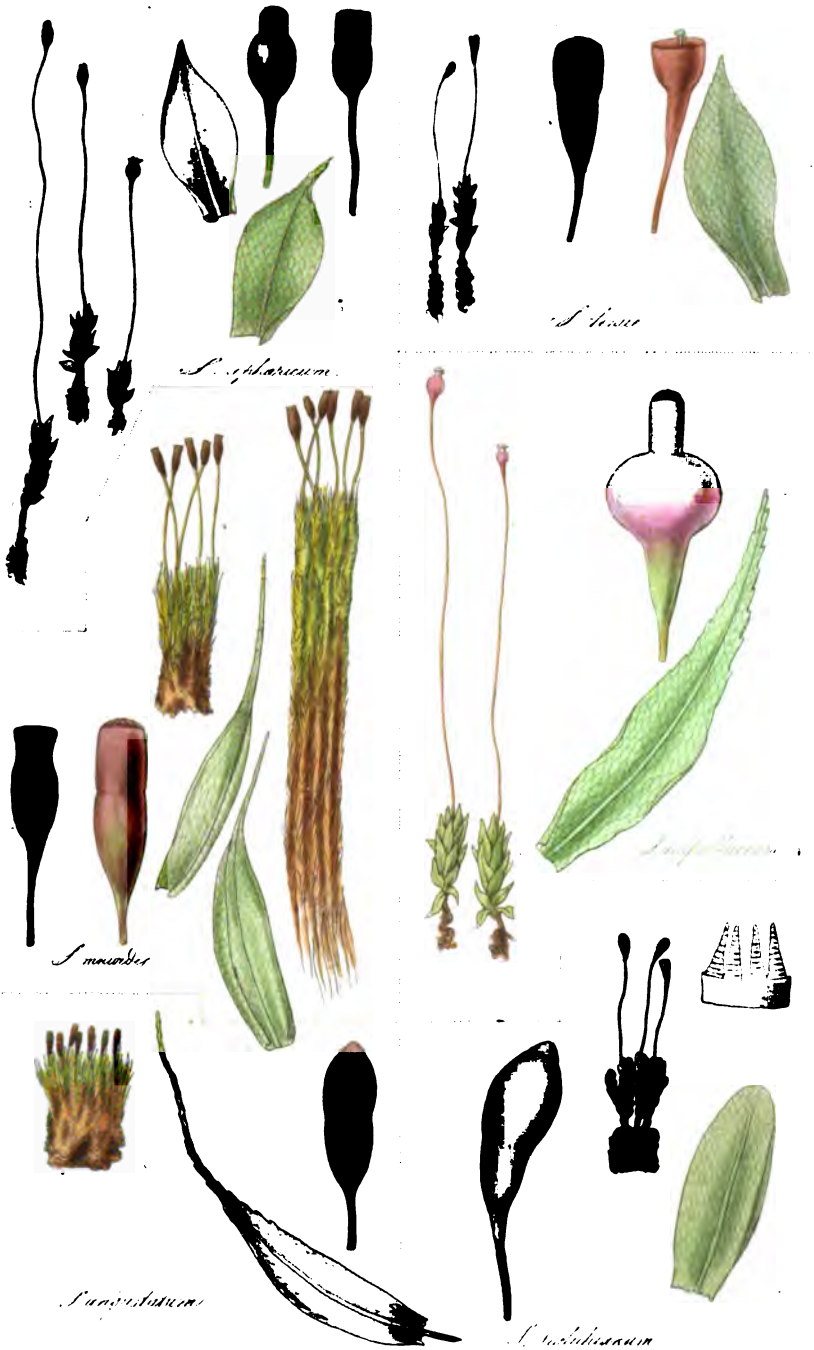
(CONOSTOMUM AND PART OF POLYTRICHUM.)

C. boreale. Tuft, *nat. size*. Portion of a branch and leaf, *magn*.
POLYTRICHUM *undulatum*. Plant, *nat. size*. Leaf, point of a leaf, and central portion of a leaf, showing the nerve, *magn*.
P. hercynicum. Plant, *nat. size*. Leaves, *magn*.
P. piliferum. Plants, *nat. size*. Leaf, and point of leaf, *magn*.
P. juniperinum, *nat. size*. Leaf, *magn*.
P. septentrionale. Tuft, *nat. size*. Leaf, and point of a leaf, *magn*.
P. commune. Plant, *nat. size*. Leaf, and point of a leaf, *magn*.

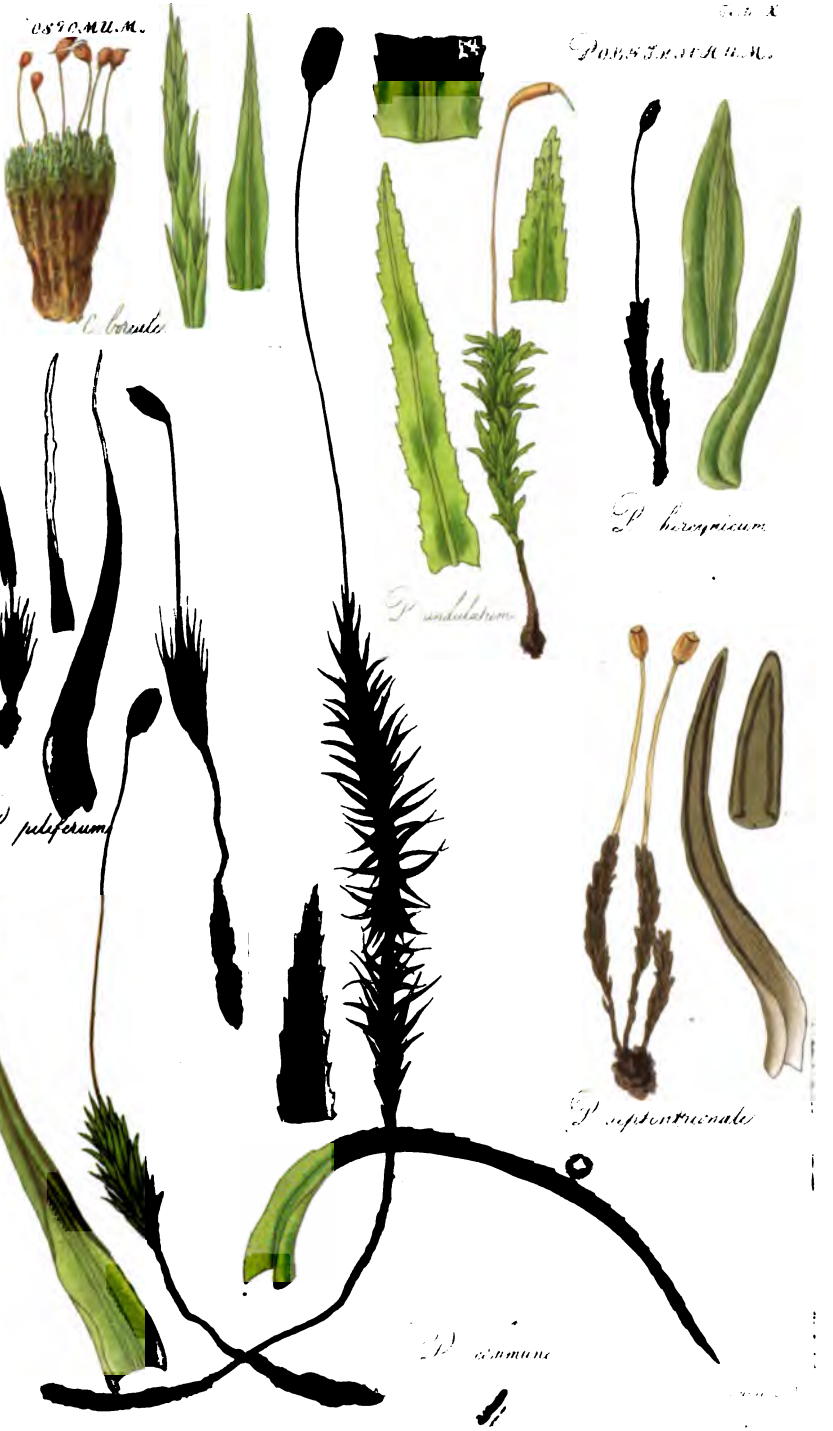
TAB. XI. SPECIES.

(POLYTRICHUM CONTINUED, AND CINCLIDOTUS.)

P. commune. Plant, *nat. size*. Leaf and Capsules, *magn*.
P. urnigerum. Plant, *nat. size*. Leaf, *magn*.
P. aloides. Plants, *nat. size*. α. and β. Leaf, and point of leaf, *magn*.
P. nanum. Plants, *nat. size*. Leaf, and point of leaf, *magn*.
CINCLIDOTUS *fontinaloides*. Plant, *nat. size*. Leaf, Capsule, and Perichætial leaf, *magn*.


S. sphaericum
S. mucronatum
S. cuspidatum

POLYTRICHUM.



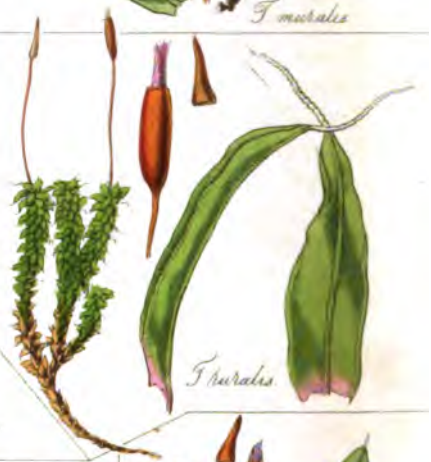
L. alpinum.
L. nanum.
L. uncinatum.
Paludos.
CANCELLATUS.
C. frondosoides.

TORTULA.

T. ruralis

T. muralis

T. subulata



T. ruralis

T. cuneifolia

T. stellata

T. tortuosa

T. fallax

T. revoluta

T. convoluta

T. convoluta

TAB. XII. SPECIES.

(TORTULA.)

T. rigida. Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

T. muralis. Tuft and single plant, *nat. size.* Leaf and Capsule, *magn.*

T. subulata. Plants, *nat. size.* Leaf and Peristome, *magn.*

T. ruralis. Plant, *nat. size.* Leaves, Capsule, and Operculum, *magn.*

T. tortuosa. Plants, *nat. size.* and Leaf, *magn.*

T. cuneifolia. Plants, *nat. size.* Leaves, *magn.*

T. stellata. Plants, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

T. fallax. Plants, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

T. revoluta. Plant, *nat. size,* Portion of plant, showing the Perichætium. Leaf, (f. 1.) point of leaf, (f. 2.) and Perichætial leaf, (f. 3.) *magn.*

T. unguiculata. Tufts, *nat. size.* Leaf, and point of leaf, *magn.*

T. convoluta. Plant, *nat. size.* Portion of plant, Leaf, (f. 1.) and Perichætial leaf, (f. 2.) *magn.*

TAB. XIII. SPECIES.

(ENCALYPTA AND GRIMMIA.)

E. streptocarpa. Plant, *nat. size.* Leaf and Calyptra, *magn.*

E. vulgaris. Tuft, *nat. size.* Leaves, Capsule, and Calyptra, *magn.*

E. ciliata. Tufts, *nat. size.* Leaves, Capsule, and Calyptra, *magn.*

GRIMMIA *apocarpa.* Plants in various states, *nat. size.* Cauline leaves, (f. 1. 1.) point of cauline leaves, (f. 2.) Perichætial leaves, (f. 3. 3.) and point of Perichætial leaves, (f. 4.) *magn.*

G. maritima. Tuft, *nat. size.* Leaves, and point of cauline leaf, (f. 1. 11.) Perichætial leaves, and point of Perichætial leaves, *magn.*

G. saxicola. Plant, *nat. size.* (f. 1.) Plant, (f. 2.) Leaf, (f. 3. 4.) and Calyptra, (f. 5.) *magn.*

G. pulvinata. Tuft, *nat. size*, and single plants. Leaf and teeth of the Peristome, *magn.*

G. Daviesii. Tuft, *nat. size.* Leaves, (f. 1. 1.) Perichætial leaf, (f. 2.) Capsule, Calyptra, and teeth of the Peristome, *magn.*

G. Doniana. Plants, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

TAB. XIV. SPECIES.

(PTEROGONIUM AND PART OF WEISSIA.)

P. Smithii. Plant, *nat. size.* Leaves, (f. 1. 1.) Perichætium and Capsule, (f. 2.) and Perichætial leaf, (f. 3.) *magn.*

P. gracile. Plant, *nat. size.* Leaves, (f. 1. 1.) Perichætial leaf, (f. 2. 2.) and Capsule, (f. 3.) *magn.*

P. filiforme. Plant, *nat. size.* Leaf, and apex of a leaf, and Capsule, *magn.*

WEISSIA *splachnoides.* Plants, *nat. size.* Leaf and Capsule, and teeth of the Peristome, *magn.*

W. Templetoni. Plants, *nat. size.* Leaves and Capsule, *magn.*

W. nuda. Plants, *nat. size.* Leaves, Capsules, portion of the mouth of the Capsule, and tooth of the Peristome, *magn.*

W. nigrita. Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

W. Starkeana. Tuft, *nat. size.* Single plant, Leaves, Capsule, teeth of the Peristome and Opercula, *magn.*

W. affinis. Plants, *nat. size.* Single plant, Leaves, mouth of the Capsule, and teeth of the Peristome, *magn.*

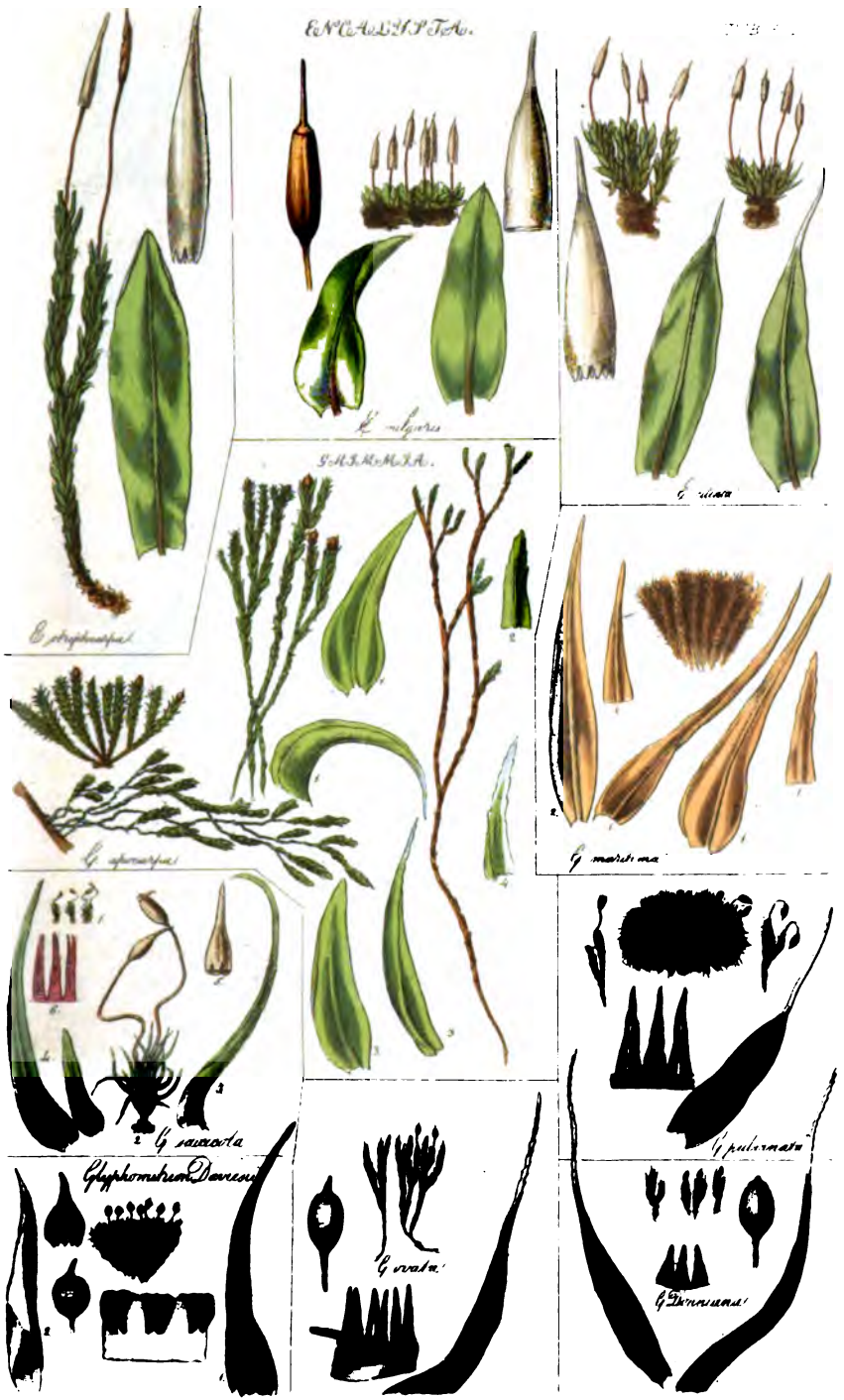
W. lanceolata. Plants, *nat. size.* Single plant, Leaf, and teeth of the Peristome, *magn.*

W. curvirostra. Tuft, *nat. size.* Leaf, Capsule, mouth of the Capsule, and teeth of the Peristome, *magn.*

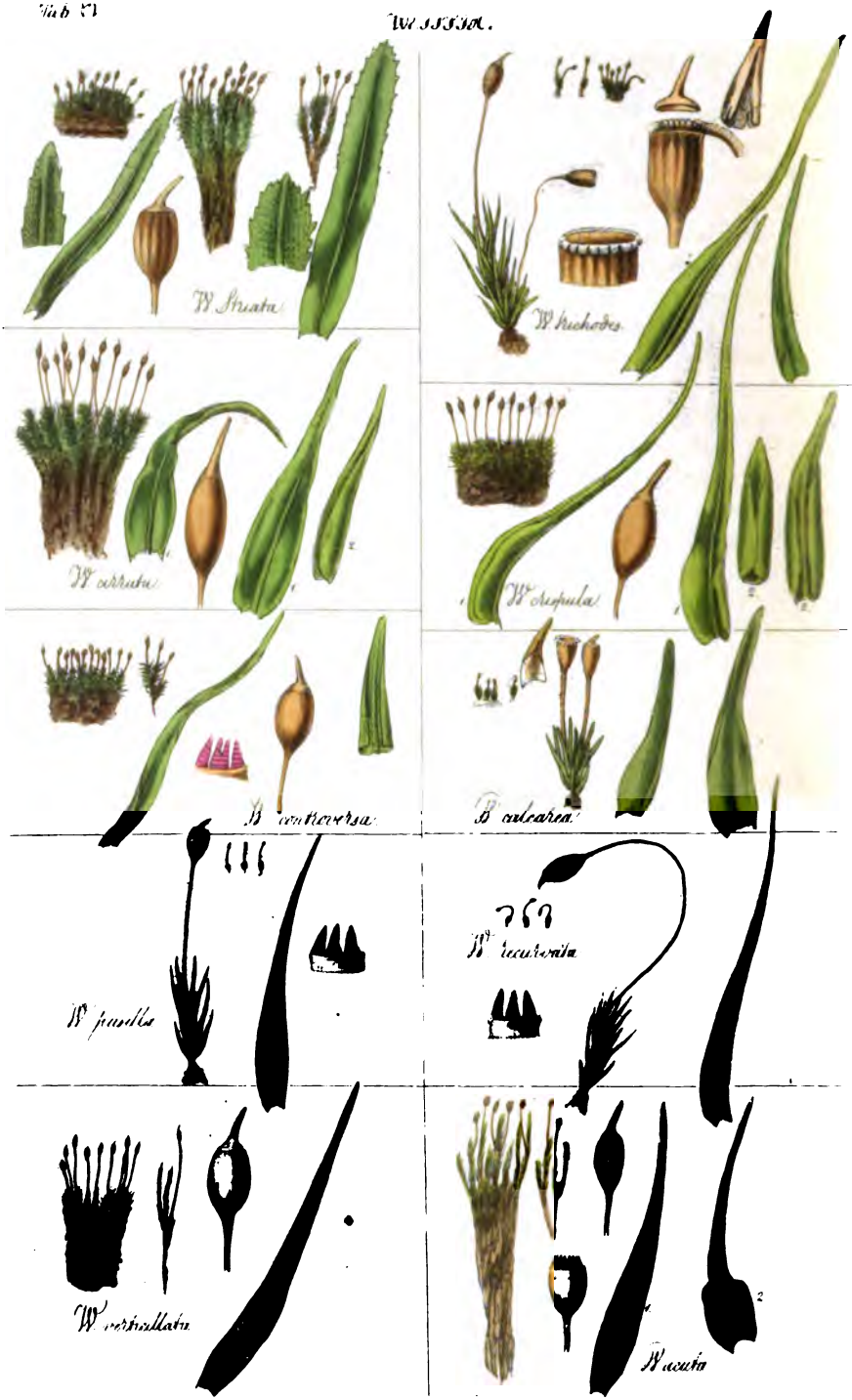
TAB. XV. SPECIES.

(WEISSIA CONTINUED.)

W. striata. Tufts, *nat. size.* Leaves, points of Leaves, and Capsule, *magn.*


ENCALYPTA.
SPHAGNUM.
Glyphomitrium Dennesii

PTEROSONIUM.
Pt. Smithii
Pt. Gracile
Pt. filiformis
WEISSIA.
W. Splachnoides
W. Templetoni
W. nuda
W. nigrita
W. Starkeana
W. affinis
W. lanceolata


W. Striata
W. trichodes
W. curvata
W. stipulacea
W. controversa
B. calcarea
W. fasciculata
W. recurvirostra
W. verticillata
W. acuta

W. trichodes. Plants, *nat. size.* Single plant, Leaves, Capsule, mouth of the Capsule, Operculum, and Calyptra, *magn.*

W. cirrata. Tuft, *nat. size.* Leaves, (f. 1. 1.) Perichætial leaf, (f. 2.) and Capsule, *magn.*

W. crispula. Tuft, *nat. size.* Leaves, (f. 1. 1.) Perichætial leaves, (f. 2. 2.) and Capsule, *magn.*

W. controversa. Tuft and single plant, *nat. size.* Leaf, point of a Leaf, Capsule, and teeth of the Peristome, *magn.*

W. calcarea. Plants, *nat. size.* Single plant, Leaves, and Calyptra, *magn.*

W. pusilla. Plants, *nat. size.* Single plant, Leaf, and teeth of the Peristome, *magn.*

W. recurvata. Plants, *nat. size.* Single plant, Leaf, and teeth of the Peristome, *magn.*

W. verticillata. Tuft and single Plant, *nat. size.* Leaf, and Capsule, *magn.*

W. acuta. Tuft and single Plant, *nat. size.* Leaf, (f. 1.) Perichætial leaf, (f. 2.) and Capsules, *magn.*

TAB. XVI. SPECIES.

(PART OF DICRANUM.)

D. bryoides. (f. 1. 2.) Plants, *nat. size,* and *magn.* of var. *α.* (f. 3.) Plants of var. *β.* (f. 4.) Superior leaf, (f. 5.) Inferior leaf, (f. 6.) Apex of a leaf, *magn.*

D. adiantoides. Plant, *nat. size,* (f. 1.) Perichætium, (f. 2.) Leaf, (f. 3.) *magn.*

D. taxifolium. Plant, *nat. size,* (f. 1.) Plant, (f. 2.) Leaf, (f. 3.) Perichætial leaf, (f. 4.) *magn.*

D. glaucum. Sterile and fertile plants, *nat. size.* Leaf, and portion of a leaf, *magn.*

D. latifolium. Plant, *nat. size.* Capsule, Leaves, and Peristome, *magn.*

D. longifolium. Plant, *nat. size.* Capsule, Leaf, and portion of a leaf, showing the broad nerve, *magn.*

D. cerviculatum. Tuft, *nat. size.* Leaves and Capsule, *magn.*

D. flexuosum. Plants, *nat. size.* (f. 1, 2, 3.) Leaves, Capsule, and Calyptra, *magn.*

TAB. XVII. SPECIES.

(DICRANUM CONTINUED.)

D. virens. Tuft, *nat. size.* Leaf, apex of leaf, and Perichætial leaf, *magn.*

D. strumiferum. Tuft, *nat. size.* Leaf and Capsule, *magn.*

D. varium. Tufts of α, β, and γ, *nat. size.* Capsules of *D. varium.* Leaves of *D. varium*, magn.

D. falcatum. Tufts, *nat. size.* Leaf and Capsules, *magn.*

D. Starkii. Tuft, *nat. size.* Capsule and leaf, *magn.*

D. flexuosum. Tuft, *nat. size.* Leaf, apex of leaf, and Capsule, *magn.*

D. pellucidum. Tuft, *nat. size.* Capsule and leaf, *magn.*

D. squarrosum. Tufts, *nat. size.* Leaves and Capsule, *magn.*

D. spurium. Plant, *nat. size.* Leaves, and portion of a leaf, *magn.*

D. crispum. Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

TAB. XVIII. SPECIES.

(DICRANUM CONTINUED.)

D. Scottianum. Tuft, *nat. size.* Leaf, (f. 1.) Perichætial leaf, (f. 2.) and Capsule, *magn.*

D. polycarpum. Tuft, *nat. size.* Leaf, (f. 1.) Perichætial leaf, (f. 2.) and Capsule, *magn.*

D. scoparium. Plants, *nat. size.* α. and β. Leaves, (f. 1, 2.) Perichætial leaf, (f. 3.) *magn.*

D. undulatum. Plants, *nat. size.* Leaf, (f. 1.) Perichætial leaf, (f. 2.) *magn.*

D. heteromallum. Tuft, *nat. size.* Leaf, (f. 1.) Apex of leaf, (f. 2.) and Capsule, *magn.*

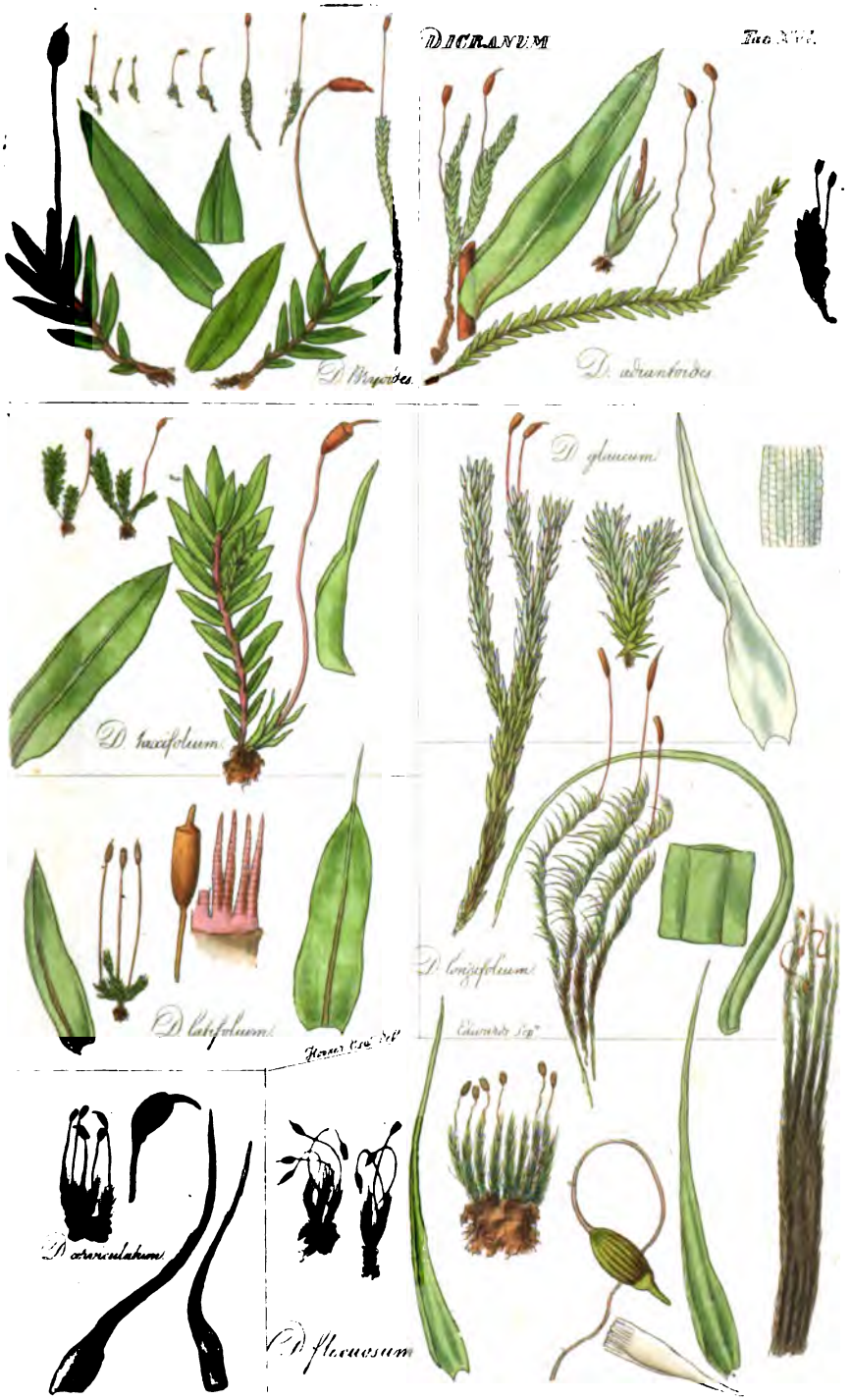
D. subulatum. Tuft, *nat. size.* Leaves, (f. 1. 1.) Apex of leaf, and Capsule, *magn.*

TAB. XIX. SPECIES.

(TRICHOSTOMUM.)

T. patens. Plant, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

T. lanuginosum. Plant, *nat. size.* Leaf and Capsule, *magn.*


DICRANUM
Tab. XVI.
D. Mnioides.
D. adiantoides
D. glaucum
D. taxifolium
D. latifolium
D. longifolium
D. octoradiatum
D. flavescens

D. virens
D. strumiferum
D. varium
D. falcatum
D. Starkii
D. flavescens
D. fulvum
D. squarrosum
D. heteromallum
D. crispum

Tab. XVIII.

DICRANUM.

TRICHOSTOMUM.

T. crispum

T. canescens

T. heterostichum

T. mucronatum

T. acuminatum

T. mucronifolium

T. lanuginosum

T. elatum

LEUCODON.

L. sciuroides

D. purpureum.

DIDYMODON.

D. inclinatum.

D. nervosum.

D. flexifolium.

D. fugitivulum.

D. Hopperianum.

D. capillaceum.

Edwards Sculp.

FUNARIA.

F. hygrometrica.

F. hygrometrica.

F. muhlenbergii.

F. hygrometrica.

T. canescens. Plants, *nat. size.* Leaf, Capsule, and teeth, *magn.*

T. heterostichum. Tuft, *nat. size.* Leaf, Capsule, and teeth of the Peristome, *magn.*

T. microcarpon. Tuft, *nat. size.* Leaf, Capsules, and teeth of the Peristome. *magn.*

T. aciculare. Plant, *nat. size.* Leaf and Capsule, *magn.*

T. fasciculare. Plant, *nat. size.* Leaf and Capsule, *magn.*

T. polyphyllum. Tuft, *nat. size.* Leaf and Capsule, *magn.*

T. ellipticum. Tuft, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

TAB. XX. SPECIES.

(LEUCODON TO FUNARIA.)

L. sciuroides. Plant, *nat. size.* Leaf, (f. 1.) Outer Perichætial leaf, (f. 2.) Inner Perichætial leaf, (f. 3.) *magn.*

DIDYMODON *purpureum.* Tufts, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

D. inclinatum. Tuft, *nat. size.* Leaf and Capsule, *magn.*

D. nervosum. Tuft, *nat. size.* Single plant, Leaf, Capsule, Operculum, and teeth of the Peristome, *magn.*

D. flexifolium. Tufts and single plant, *nat. size.* Leaf of the stem, (f. 1.) and Leaf of the Perichætium, (f. 2.) *magn.*

D. rigidulum. Tuft and single plant, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

D. trifarium. Tufts, (f. 1. 2.) *nat. size.* Leaves, (f. 3. 4.) Capsule, and teeth of the Peristome, *magn.*

D. capillaceum. Tufts, *nat. size.* Leaf and Capsule, *magn.*

D. heteromallum. Tuft and single plants, *nat. size.* Leaves, Capsule, Operculum, and teeth of the Peristome, *magn.*

FUNARIA *hygrometrica.* Plants, *nat. size.* Leaf, *magn.*

F. Muhlenbergii. Plants, *nat. size.* Leaf, *magn.*

F. hibernica. Plants, *nat. size.* Leaf, *magn.*

TAB. XXI. SPECIES.

(ZYGODON AND PART OF ORTHOTRICHUM.)

ZYGODON *conoideum.* Tuft, *nat. size.* Plant and leaf, *magn.*

ORTHOTRICHUM *anomalum*. Tuft, *nat. size*. Leaf, mouth of the Capsule, and Calyptra, *magn*.

O. cupulatum. Tuft, *nat. size*. Leaf, mouth of the Capsule, teeth of the Peristome, and Calyptra, *magn*.

O. crispum. Tuft, *nat. size*. Leaf, Capsule, and Calyptra, *magn*.

O. Hutchinsiæ. Tuft, *nat. size*. Leaf, Capsule, and Calyptra, *magn*.

O. affine. Tuft, *nat. size*. α. and β. Leaf, mouth of the Capsule, and Calyptra, *magn*.

O. diaphanum. Tufts, *nat. size*. Leaf, mouth of the Capsule, and Calyptra, *magn*.

O. pulchellum. Tuft, *nat. size*. Leaf, mouth of the Capsule, and Calyptra, *magn*.

O. rivulare. Plant, *nat. size*. Mouth of the Capsule, Leaf, tooth of the Peristome, and Calyptra, *magn*.

O. striatum. Plants, *nat. size*. Leaf, Capsule, mouth of the Capsule, teeth of the Peristome, and Operculum, *magn*.

TAB. XXII. SPECIES.

(ORTHOTRICHUM TO BUXBAUMIA.)

O. Lyellii. Plant, *nat. size*. Leaf, Capsules, with the Peristomes erect and reflexed, mouth of the Capsule, and teeth of the Peristome, *magn*.

NECKERA *pumila*. Leaf, (f. 1.) Perichætial leaves, (f. 2. 3.) Capsule and Perichætium, *all magn*.

N. crispa. Leaf, Capsule, and Perichætium, *all magn*.

ANOMODON *curtipendulum*. Leaf, (f. 1.) Perichætial leaf, (f. 2.) Capsule, and Perichætium, *all magn*.

A. viticulosum. Leaf, (f. 1.) Apex of a leaf, (f. 2.) Perichætial leaf, (f. 3) Capsule, and Perichætium, *all magn*.

DALTONIA *splachnoides*. Plants, *nat. size*. (f. 1.) Single plant, (f. 2.) Leaf, (f. 3.) Perichætial leaf, (f. 4.) Capsule and Perichætium, (f. 5.) portion of the Capsule with the Peristome, (f. 6.) base of the Calyptra, (f. 7.) and the Calyptra, (f. 8.) *magn*.

D. heteromalla. Leaf, (f. 1.) Perichætial leaf, (f. 2.) Capsule and Perichætium, (f. 3.) *magn*.

FONTINALIS *antipyretica*. Portions of the stem, *nat. size*. Leaf, (f. 1.) Perichætial leaf, (f. 2.) *magn*.

ZYGODON.

Z. conoideum

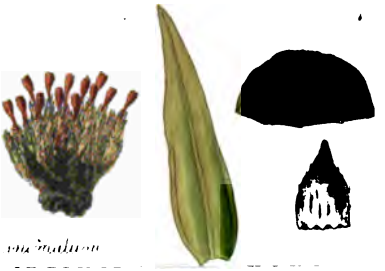
O. cupulatum

O. Hutchinsiæ

O. daphnoides

O. rivulare

ORTHOTRICUM.



O. vaginatum

O. crispum

O. affine

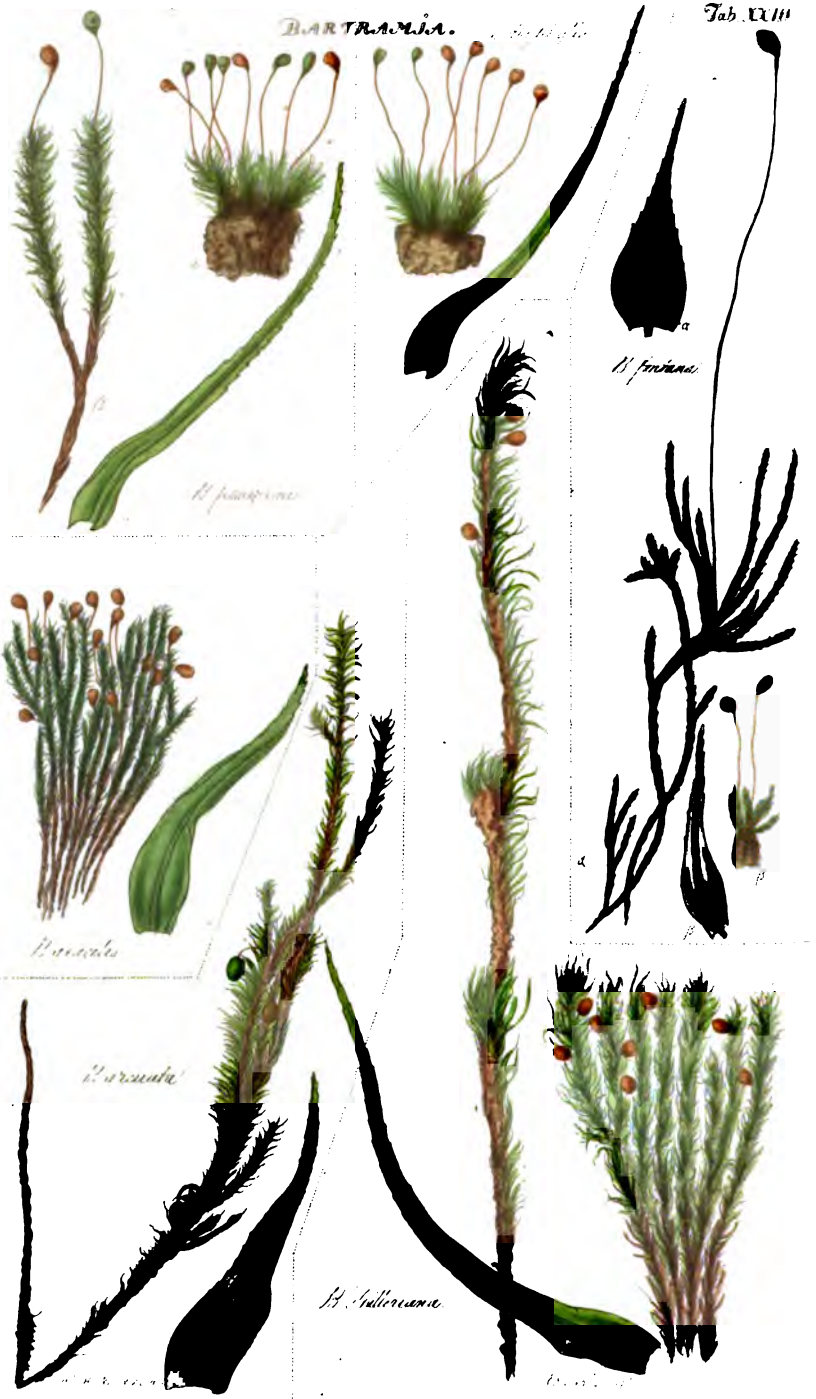
O. fastigiatum

O. striatum

ORTHOTRICHUM.

Leucopogon

BARTRAMIA.



H. trichomanoides

H. complanatum

H. cupressiforme

H. undulatum

H. denticulatum

H. incurvum

H. scalellum

H. serpens

H. populeum

H. reflexum

H. molle

H. striatum

H. crista-castrense

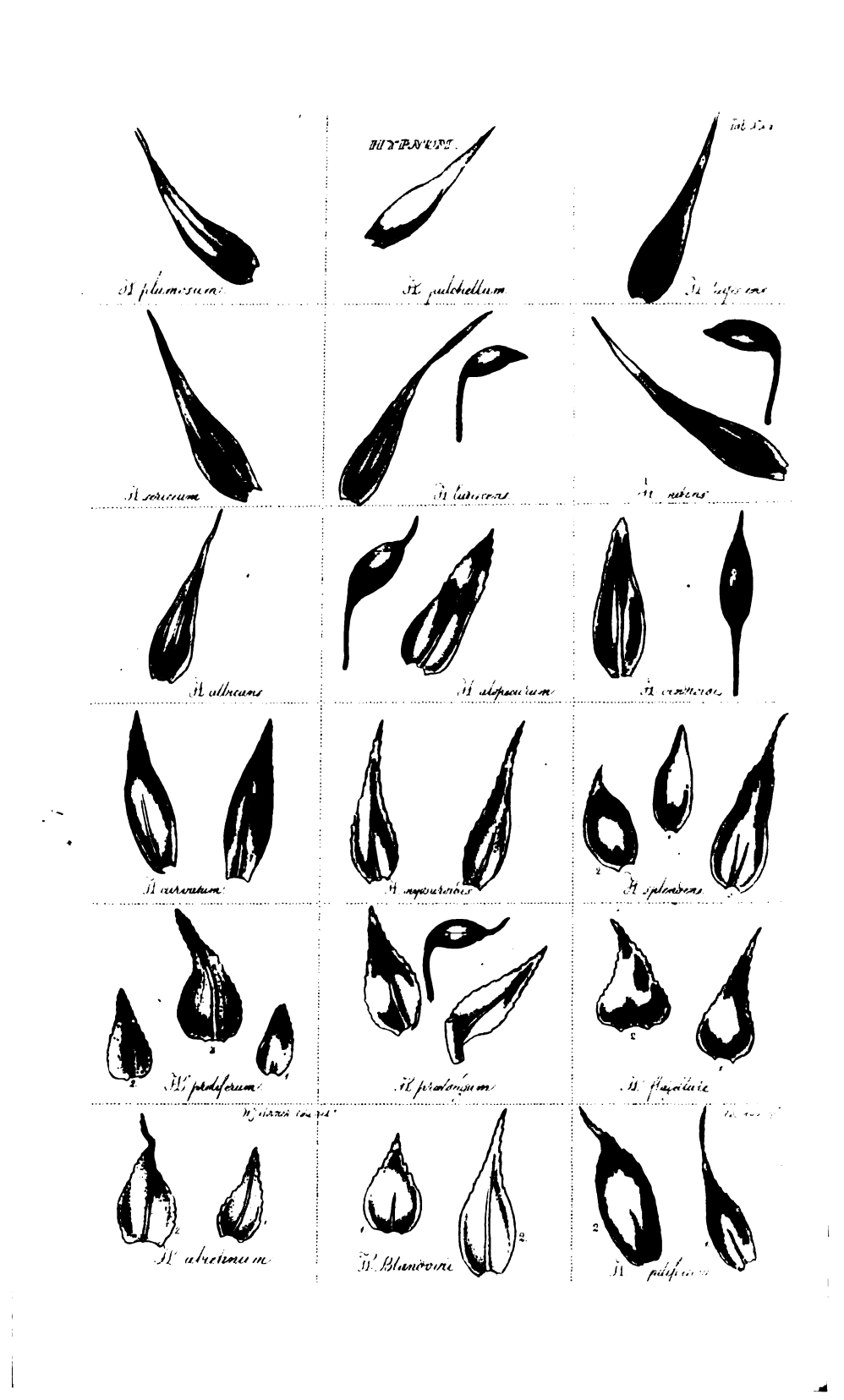
H. Schreberi

H. catenulatum

H. [illegible]

H. purum

H. flaccum


HYPNUM.
H. plumosum
H. pulchellum
H. sericeum
H. illecebrum
H. albicans
H. adspersum
H. curvatum
H. splendens
H. pediferum
H. praelongum
H. albicomum
H. Blumeanum

F. squamosa. Portions of the stem, *nat. size.* Leaves, (f. 1.) Perichætial leaf, (f. 2.) *magn.*
F. capillacea. Portion of the stem, *nat. size.* Leaves, *magn.*

TAB. XXIII. SPECIES.

(BARTRAMIA.)

B. pomiformis. Plants α. β. *nat. size.* Leaf, *magn.*
B. ithyphylla. Plant, *nat. size.* Leaf, *magn.*
B. gracilis. Tuft, *nat. size.* Leaf, *magn.*
B. fontana. Plants α. and β. *nat. size.* Leaves of α. and β. *magn.*
B. Halleriana. Tuft and single plant, *nat. size.* Leaf, *magn.*
B. arcuata. Plant, *nat. size.* Leaf, *magn.*

TAB. XXIV. SPECIES.

(HYPNUM.)

H. trichomanoides. Leaf, *magn.*
H. complanatum. Leaves, *magn.*
H. riparium. Leaf, *magn.*
H. undulatum. Leaves and Capsule, *magn.*
H. denticulatum. Leaves and Capsule, *magn.*
H. medium. Leaf, *magn.*
H. tenellum. Leaves, *magn.*
H. serpens. Leaves, *magn.*
H. populeum. Leaves, *magn.*
H. reflexum. Leaves, *magn.*
H. molle. Leaves, *magn.*
H. stramineum. Leaf, *magn.*
H. moniliforme. Plant, *nat. size.* Leaf, (f. 1.) Perichætial leaf, (f. 2.) and Capsule, *magn.*
H. Schreberi. Leaf, *magn.*
H. catenulatum. Plant, *nat. size.* Leaf and Capsule, *magn.*
H. murale. Leaf and Capsule, *magn.*
H. purum. Leaf and Capsule, *magn.*
H. fluitans. Leaf, *magn.*

TAB. XXV. SPECIES.

(HYPNUM CONTINUED.)

H. plumosum. Leaf, *magn.*

H. pulchellum. Leaf, *magn.*
H. rufescens. Leaf, *magn.*
H. sericeum. Leaf, *magn.*
H. lutescens. Leaf and Capsule, *magn.*
H. mitens. Leaf and Capsule, *magn.*
H. albicans. Leaf, *magn.*
H. alopecurum. Leaf and Capsule, *magn.*
H. dendroides. Leaf and Capsule, *magn.*
H. curvatum. Leaves, *magn.*
H. myosuroides. Leaves, *magn.*
H. splendens. Leaf of a young shoot, (f. 1.) Leaf of main branch, (f. 2.) Leaf of main stem, (f. 3.) *magn.*
H. proliferum. Leaf of a young shoot, (f. 1.) Leaf of main branch. (f. 2.) Leaf of main stem, (f. 3.) *magn.*
H. prælongum. Leaves and Capsule, *magn.*
H. flagellare. Leaf of a branch, (f. 1.) Leaf of main stem, (f. 2.) *magn.*
H. abietinum. Leaf of a branch, (f. 1.) Leaf of main stem, (f. 2.) *magn.*
H. Blandovii. Leaf of main stem, (f. 1.) Leaf of a branch, (f 2.) *magn.*
H. piliferum. Leaf of a branch, (f. 1.) Leaf of main stem, (f. 2.) *magn.*

TAB. XXVI. SPECIES.

(HYPNUM CONTINUED.)

H. rutabulum. Leaf and Capsule, *magn.*
H. velutinum. Leaves and Capsule, *magn.*
H. ruscifolium. Leaf, *magn.*
H. striatum. Leaf and Capsule, *magn.*
H. confertum. Leaf and Capsule, *magn.*
H. cuspidatum. Leaf, *magn.*
H. cordifolium. Leaf, *magn.*
H. polymorphum. Leaf, *magn.*
H. stellatum. Leaves, *α.* and *β. magn.*
H. loreum. Leaf, *magn.*
H. triquetrum. Leaf, *magn.*

H. tenuifolium

H. velutinum

H. Roseifolium

H. viridum

H. confertum

H. cuspidatum

H. retusifolium

H. polymorphum

H. reflexum

H. Lilium

H. Virginianum

H. superbum

H. pluviatum

H. Catesbæi

H. ornatum

H. pallidum

H. Canadense

H. superbum

H. commutatum.

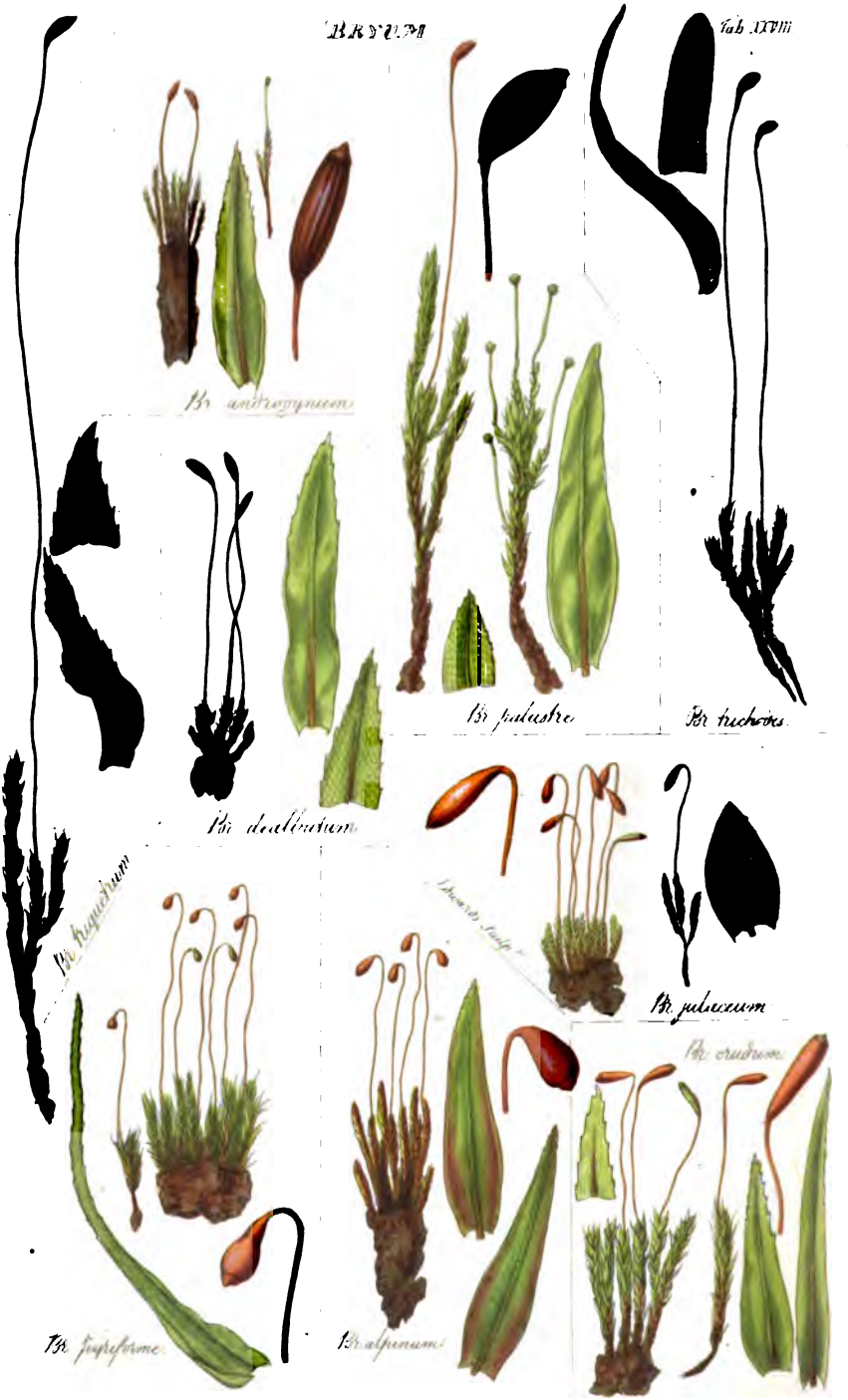
H. scalpicuspis

H. sikkimense

H. cupressiforme

H. Crista-castrensis

H. molluscum


Br. androgynum.
Br. palustre
Br. trichodes.
Br. dealbatum.
Br. roseum
Br. julaceum
Br. crudum.
Br. fuscum.
Br. alpinum.

H. squarrosum. Leaf, *magn.*
H. filicinum. Leaves, *magn.*
H. atro-virens. Leaves, *magn.*
H. uncinatum. Leaves, *magn.*
H. palustre. Leaves, *magn.*
H. aduncum. Leaves, *magn.*
H. rugulosum. Leaf, *magn.*

TAB. XXVII. SPECIES.

(HYPNUM CONCLUDED, AND HOOKERIA.)

H. commutatum. (f. 1.) Leaf from a smaller branch. (f. 2.) Leaf from a main branch. (f. 3.) Leaf from the main stem, *magn.*
H. scorpioides. Leaves, *magn.*
H. Silesianum. Leaves and Capsule, *magn.*
H. cupressiforme. (f. 1.) Leaves of α. (f. 2.) Leaves of γ. (f. 3.) Capsule, *magn.*
H. cristacastrensis. (f. 1.) Leaf from a smaller branch. (f. 2.) Leaf from the main branch. (f. 3.) Leaf from the main stem, *magn.*
H. molluscum. Leaves, *magn.*
HOOKERIA *lucens.* Plant, *nat. size.* Leaf, Capsule, and Calyptra, *magn.*
H. lætevirens. Plant, *nat. size.* Leaves, point of a leaf, Capsule, and Calyptra, *magn.*

TAB. XXVIII. SPECIES.

(BRYUM.)

B. androgynum. Tufts, *nat. size.* Leaf and Capsule, *magn.*
B. palustre. Plants, *nat. size.* Leaf and Capsule, *magn.*
B. trichodes. Plants, *nat. size.* Leaf and point of a leaf, *magn.*
B. dealbatum. Tuft, *nat. size.* Leaf and point of a leaf, *magn.*
B. triquetrum. Plant, *nat. size.* Leaf, and point of a leaf, *magn.*
B. pyriforme. Tuft and single specimen, *nat. size.* Leaf and Capsule, *magn.*
B. julaceum. Tuft and single plant, *nat. size.* Leaf and Capsule, *magn.*
B. alpinum. Tuft and single plant, *nat. size.* Leaves, and point of a leaf, *magn.*

TAB. XXIX. SPECIES.

(BRYUM CONTINUED.)

B. carneum. Tufts, *nat. size.* Leaves and Capsule, *magn.*

B. argenteum. Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

B. Zierii. Plant, *nat. size.* Leaf, *magn.*

B. capillare. Tuft, *nat. size.* Leaves and Capsule, *magn.*

B. roseum. Plant, *nat. size.* Leaf, *magn.*

B. cæspiticium. (f. 1.) Tuft, *nat. size.* (f. 2.) Tuft of *β. nat. size.* (f. 3.) Leaves of *α. magn.* (f. 4.) Leaf of *β. magn.* (f. 5.) Capsule of *α. magn.* (f. 6.) Capsule of *β. magn.*

B. turbinatum. Plant, *nat. size.* Leaves and Capsules, *magn.*

B. nutans. Tuft of plant, *nat. size.* Leaves and Capsules, *magn.*

TAB. XXX. SPECIES.

(BRYUM CONTINUED.)

B. elongatum. Plants, *nat. size.* (f. 1.) Cauline leaf, (f. 2.) Perichætial leaf, (f. 3.) Capsule, *magn.*

B. ventricosum. Plant, *nat. size,* (f. 1. and 2.) Leaves and Capsule, *magn.*

B. rostratum. Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

B. ligulatum. Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

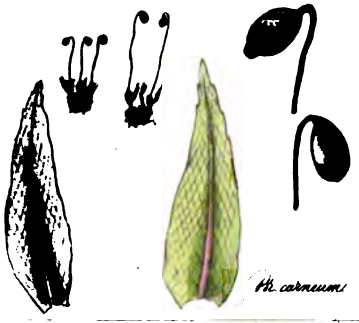
TAB. XXXI. SPECIES.

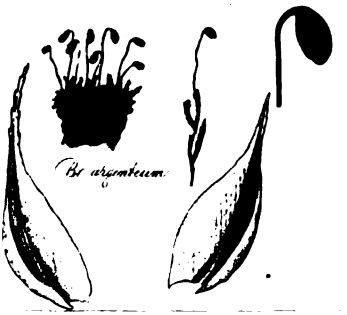
(BRYUM CONTINUED, AND SUPPLEMENT I.)

B. hornum. Tuft, *nat. size.* (f. 1.) Leaf, (f. 2.) Perichætial leaf, and portion of leaf, Capsule, and Lid, *magn.*

B. marginatum. Plant, *nat. size.* (f. 1.) Leaf, (f. 2.) Cauline leaf, portion of leaf, and Capsule, *magn.*

B. cuspidatum. Plants, *nat. size.* (f. 1.) Leaf, (f. 2.) Perichætial leaf, portion of leaf, Capsule, and Lid, *magn.*


Br. carneum

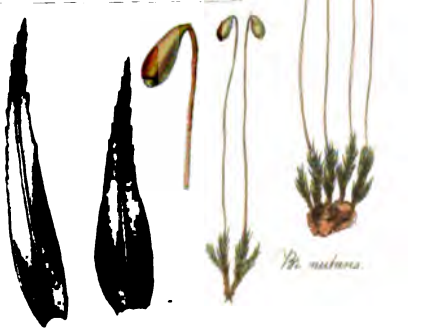

Br. argenteum

Br. Lucens
Br. Roseum

Br. Capillare

Br. caespiticium
Hooker Exot. Bot.
Edwards Bot.

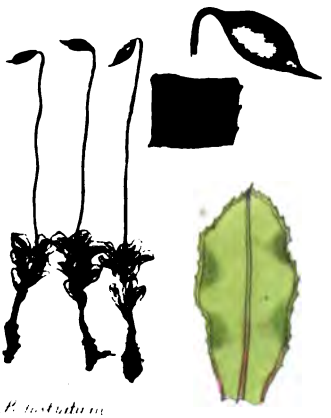
Br. subbornatum


Br. nutans

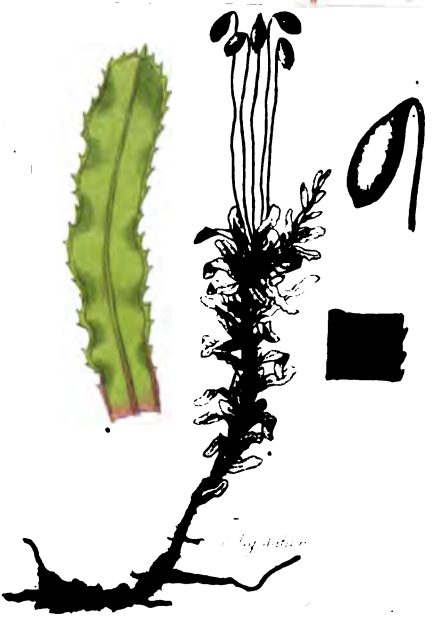
B. elongatum.

B. punctatum.

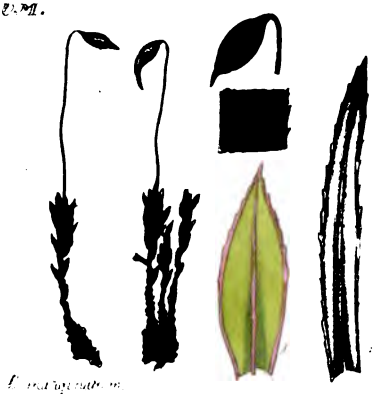
B. [illegible]



B. [illegible]



B hornum



Splachnum

Gymnost. rupestre.

Tortula brevirostris.

Tortula cuneifolia.

Tort. gracilis.

Encalypta rhaphidocarpa.

Grimmia trichophylla.

Grimmia spiralis.

Grimmia torquata.

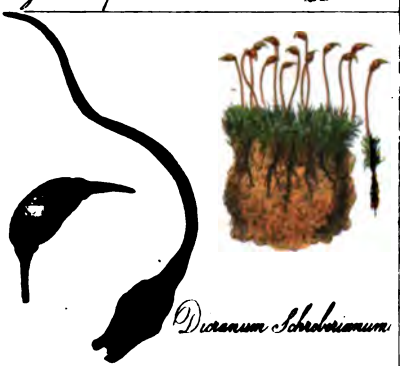
Suppl. T. III.

Grimmia leucophæa.

Grimmia unicolor.

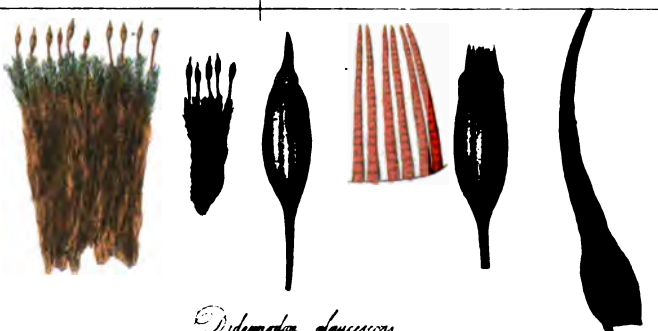
Weissia Schisti.

Weissia tenuirostris.



Dicranum Schreberianum.

Dicranum fulvellum.



Didymodon glaucescens.

R. J. Hooker ex del.

H. C. Watson lith.

Hypnum riparium.

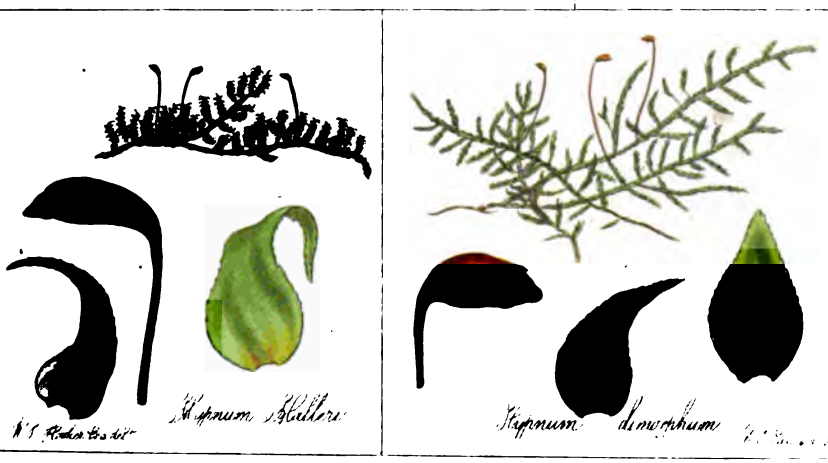
Suppl. T. V.

Hypnum polyanthos.

Hypnum [illegible]

Hypnum [illegible]

H. [illegible]



Hypnum [illegible]

Hypnum [illegible]

Timmia megapolitana

Bryum demissum

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